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In cooperation with:

U.S.D.A. Soil
Conservation Service

Regents of the
University of California
(Agricultural Experiment
Station)

Soil Survey

East Part, Inyo National Forest Area California



How To Use This Soil Survey

General Soil Map

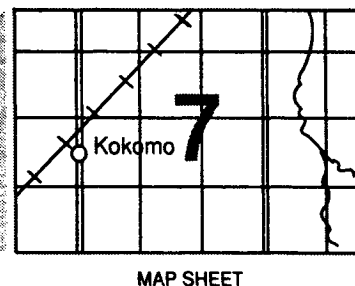
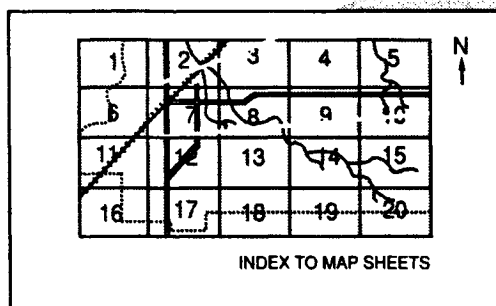
The general soil map, which is the small scale map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

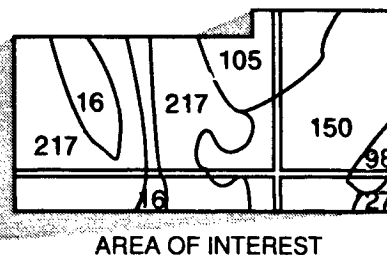
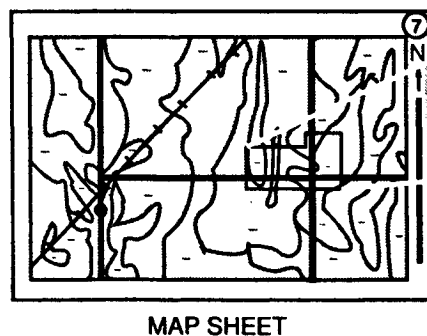
Detailed Soil Maps

The detailed soil maps are at the end of this publication. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

Inyo National Forest Area, California, East Part

This is a publication of the United States Department of Agriculture, Forest Service, Pacific Southwest Region and is a joint effort with the University of California (Agricultural Experiment Station) and the Soil Conservation Service. As a part of the National Cooperative Soil Survey, the fieldwork and technical quality control for this survey were the responsibility of the Forest Service. The correlation of the soils was done by the Soil Conservation Service in consultation with the Forest Service. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was performed in the period 1979-82. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Forest Service and the Soil Conservation Service. The soil survey area consists of the Inyo and White Mountain Ranges, and the Pizona area on the east side of the Inyo National Forest, in Inyo and Mono Counties, California and in Esmeralda and Mineral Counties, Nevada.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: View westward from the Ancient Bristlecone Pine Forest in the White Mountain Range. The Sierra Nevada Range is in the background.

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Foreward

The Soil Survey of the Inyo National Forest Area, California, East Part, in parts of Inyo and Mono Counties, California and parts of Mineral and Esmeralda Counties, Nevada, was designed to facilitate forestwide resource management planning and to increase the knowledge of our environment. It contains predictions of soil behavior for selected land uses. It also points out inherent limitations or hazards to land uses.

This soil survey has been prepared primarily for forest resource planners and managers. It is useful for preliminary project planning, for identifying general soil management considerations, and for evaluation of more intensive soil survey needs. The survey could be used for detailed resource management and project level planning with field verification.

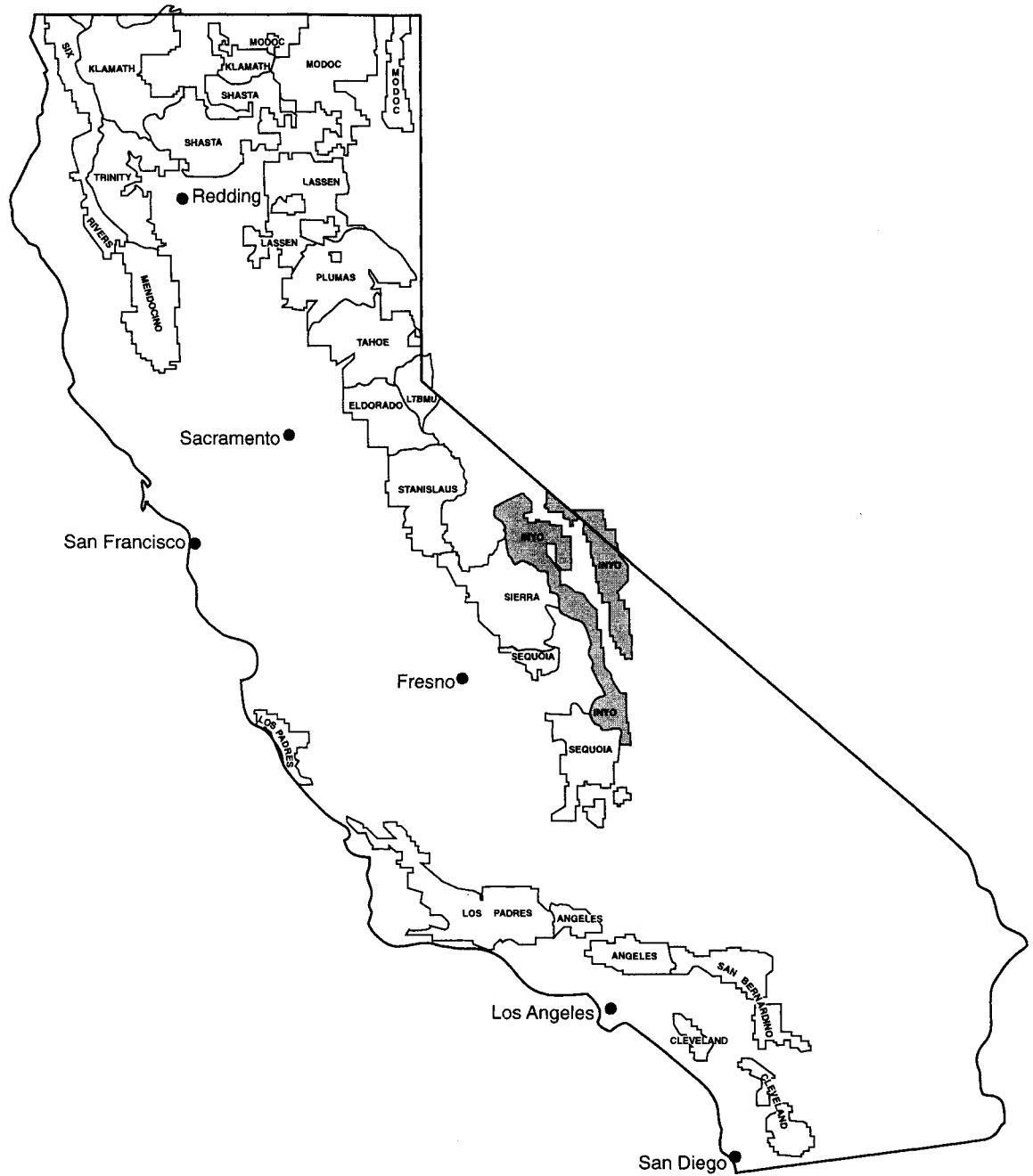
Major differences in soil properties can occur even within short distances. Some soils are shallow to bedrock and have low available water capacity. These conditions inhibit plant growth. Some soils are seasonally wet and have a high water table or are subject to flooding.

Soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each soil map unit is shown on detailed soil maps. Each kind of soil in the survey area is described, and information is given about each soil for specific uses.

This soil survey can be useful in the conservation, improvement, and productive use of soil, water, and other resources.



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Location of the Inyo National Forest Area, California, East Part

Soil Survey of Inyo National Forest Area California, East Part

By Juan A. Gallegos, Forest Service

Soils surveyed by Juan A. Gallegos and B. Scott Jackson, Forest Service,
and Western Ecological Services Company

The Inyo National Forest, East Part survey area is 669,420 acres in size. The survey area is mainly in Inyo and Mono Counties, California, with small portions in Mineral and Esmeralda Counties, Nevada.

The Inyo National Forest, East Part, because of its relatively close proximity to the Los Angeles area, and its nearness to Death Valley and Mt. Whitney, provides a wide variety of outdoor recreational opportunities. The Ancient Bristlecone Area, with the oldest living trees in the world, is located within the survey area, and attracts many visitors each year. It is also an important grazing and mining area.

General Nature of the Area

This section briefly discusses the location, geomorphology, drainage, geology, climate, growing season and vegetation of the White Mountains, the Inyo Mountains and the Pizona area.

Location and Geomorphology

The survey area encompasses most of the White-Inyo Range, and the Pizona Area, and is 669,420 acres in size. The survey area does not include all of the Inyo National Forest lands.

The White-Inyo Range

The survey area includes all of the White-Inyo Range from about one and one-half miles north of Mt. Inyo in the south to about one mile north of Sugarloaf Mountain in the north.

The White-Inyo Range, made up of the White Mountains and the Inyo Mountains, forms the east wall of the Owens Valley, and is a single continuous chain 110 miles long. It is a typical Basin and Range Province range. The Inyo Mountains form the southern portion, and the White Mountains form the northern portion of the range. This range runs in a northwestward direction. "On the south, it is separated from the Coso Mountains by a broad depression, and on the north, it terminates in Mount Montgomery. Its western face slopes off abruptly toward the Owens Valley, and is but little less precipitous than that of the Sierra on the opposite side of the valley. Its western border is thus determined by the floor of the Owens Valley, and as a whole is remarkably straight. Its eastern border is not so sharply defined. In its northern part, it is marked by Fish Lake Valley, but between this valley and the Saline Valley to the south, there is an irregular mountainous area that is not clearly separated from the [White-] Inyo Range on the west nor from the ranges in the east. Still further south, the deep elliptical depression known as the Saline Valley, whose floor is 2,500 feet lower than that of the Owens Valley, separates the [White-] Inyo Range from the Ubehebe Range on the east. The flank of the [White-] Inyo Range here is exceedingly steep and rugged. In fact, it is fully comparable in height and precipitousness with the great escarpment of the Sierra Nevada" (8). Elevation ranges from about 4,000 feet in the footslopes of the southern part of the range to 14,242 feet at the crest of White Mountain Peak.

The White-Inyo Range acquired its present topographic form by faulting which occurred about 10 million years ago. Glaciation occurred in localized areas on the east side of the northern White Mountains within the last 1 million years.

Drainage of the area is accomplished by numerous intermittent and perennial creeks. The most important of these are Cottonwood Creek in the White Mountains, which flows into Fish Lake Valley; Birch, Wyman and Crooked Creeks, which flow into the Deep Springs Basin; Willow Creek, which flows into the Eureka Valley Basin; and Waucoba Wash, which feeds the Saline Valley during flash-flood periods.

The White-Inyo Range is the product of hundreds of millions of years of geologic evolution. It formed from a triangular fault block of sedimentary, granitic and metamorphic rock, with intrusions of volcanic flows. "Sedimentary rocks of the Paleozoic age predominate the [White-] Inyo Range" (9). These sedimentary rocks include sandstone, dolomite, limestone, shale, quartzite, calcareous sandstone, marine shale and conglomerates. About 150 million years ago, the beds of sedimentary rock were faulted and folded, and the region was then invaded by great masses of adamellite (granitic rock) and other associated rocks.

The Pizona Area

The Pizona area is located northwest of the northern end of the White Mountains. It is separated from the White-Inyo Range by Queen Valley at the Nevada-California state line. It includes Antelope Mountain, the Pizonas, Adobe Hills, and the lower portions of Anchorite Hills and the Excelsior Mountains. It is bounded by the Mono Lake Valley on the west side, Cowtrack Mountain in the southwest part, Adobe Valley in the south central portion, and Benton Valley and Queen Valley in the southeastern part. The northern border is the California-Nevada state line, except in the extreme eastern part. Here it is bounded by Truman Meadows and McBride Flat, both in Nevada. The area is mountainous, although not as precipitous as the White-Inyo Range. Elevation ranges from about 6,000 feet in some footslopes adjoining the valley floor, to about 8,200 feet along some of the tallest crests.

The Pizona area acquired its present topographic form by warping and faulting which occurred within the last million years. Prior to this warping and faulting, the surface produced by the basaltic eruptions was probably a lava plain of low relief and had some areas of older rock rising above it.

Drainage of the Pizona area is accomplished by numerous intermittent and perennial creeks. The most important of these is Adobe Creek in the Pizona area, which feeds the Adobe Valley Basin.

The Pizona area formed from nonmetamorphosed andesite and rhyolite flows; sediments, mainly tuffaceous silts, sands and diatomites; and sheetlike flows of olivine basalt. The latter cover nearly the entire area, and are a result of numerous eruptions at a number of different centers over a wide area east and south of the Mono Basin.

Climate

The climate in both the Pizona area and the White-Inyo Range generally is characterized as a transition between the Mediterranean climate of the West Coast, and the Continental climate of New Mexico to the east. Winters are cool and summers are warm. The area generally receives precipitation the year round, but the majority of the moisture comes in the winter months, usually in the form of snow. Summer precipitation consists of intermittent rain showers.

The White-Inyo Range

The average annual precipitation ranges from 4 inches in the southern part to 20 inches in the northern part of the range. Precipitation is low because the moisture-laden winds from the Pacific Ocean are largely robbed of their moisture by the Sierra Nevada, before they reach the White-Inyo Range. "This is notably true in the southern part of the range, which is opposite the highest part of the Sierra Nevada. North of Bishop, however, the [White-] Inyo Range averages nearly as high as the Sierra opposite it" (8).

The Pizona Area

The average annual precipitation ranges from 8 to 12 inches. Precipitation is low because moisture-laden winds are robbed of their moisture by the Sierra Nevada, before they reach the Pizona Area.

The Growing Season

The growing season for the Pizona area and the White-Inyo Range varies by elevation. In the lower elevations, the season is during the summer and autumn months. At mid elevations, the season generally is confined to the summer months. The upper elevations have an extremely short growing season, lasting only from late June to early July. The length of the growing season for each zone in the area is as follows:

Desert Transition Zone	: 4 to 6 months
Montane Zone	: 2 to 3 months
High Montane Zone	: 2 to 5 weeks
Alpine Zone	: 1 to 4 weeks

Vegetation

The plant communities used in this report are based on the "Vegetation Classification System for Southern California" (3). The following is a list of the plant communities in the survey area and the plant series that may be in each plant community. The plant names are based on "CALVEG, A Classification of California Vegetation" (2). All of the series given for a plant community may not be on a specific site under that community.

Desert Shrub Community - the plant series in this community are Nevada Ephedra (*Ephedra Nevadensis*), Shadscale (*Artiplex confertifolia*), Spiny Mendora (*Mendora spinescens*), Fourwing Saltbrush (*Atriplex canescens*), Greenfire (*Mendora* sp.), Boxthorn (*Lycium*) and Buckwheat (*Eriogonum* sp.).

Pinon Pine - Juniper Woodland Community - the plant series in this community are Pinon Pine (*Pinus monophylla*), Utah Juniper (*Juniperus* sp.), Mountain Mahogany (*Cercocarpus ledifolius*), Big Sagebrush (*Artemisia tridentata*), Black Sagebrush (*Artemisia arbuscula nova*), Low Sagebrush (*Artemisia arbuscula*), Antelope Bitterbrush (*Purshia tridentata*), Rabbitbrush (*Chrysothamnus* sp.), Goldenbush (*Haplopappus* sp.), Mormon Tea (*Ephedra fasciculata*), Wheatgrass (*Agropyron* sp.) and Squirreltail Grass (*Sitanion* sp.).

Bristlecone Pine Community - the plant series in this community are Bristlecone Pine (*Pinu aristata*), Limberpine (*Pinus flexilis*), Big Sagebrush (*Artemisia tridentata*), Lupine (*Lupinus* sp.), Buckwheat (*Eriogonum* sp.) and Bluegrass (*Poa* sp.).

Dwarf Scrub (Alpine) Community (Cushion Plants) - the plant series in this community are Goldenbush (*Haplopappus* sp.), Low Phlox (*Phlox*

hoodi), *Carex* (*Carex* sp.), Mat Eriogonum (*Eriogonum caespitosum*), Buckwheat (*Eriogonum* sp.) and Pringle Bluegrass (*Poa pringlei*).

Montane Meadow Community - the plant series in this community are Silver Sagebrush (*Artemisia cana*), *Carex* (*Carex* sp.) and *Juncus* (*Juncus* sp.).

Montane Sandy Community - the plant series in this community are Big Sagebrush (*Artemisia tridentata*), Antelope Bitterbrush (*Purshia tridentata*) and Indian Ricegrass (*Oryzopsis hymenoides*).

The White-Inyo Range

The White-Inyo Range supports a wide variety of vegetation, from high desert to alpine type. Sagebrush and desert-type bushy plants dominate the lower elevations. The mid elevations support scattered pinon and juniper, with an understory of sagebrush and bitterbrush. The upper elevations support scattered stands of mountain mahogany, limberpine and Bristlecone pine. Open areas are dominated by mountain sagebrush. The dolomite and limestone areas of the White Mountains, in the Ancient Bristlecone Pine Area, support a nearly continuous Bristlecone pine forest, with little or no understory. The uppermost elevations of the range, at elevations above 13,000 feet, support herbs, grasses and other low-growing plants such as goldenbush, buckwheat and bluegrass.

The Pizona Area

The vegetation in the Pizona Area is highly mixed, due to deposition of wind-carried sands throughout the area. Areas bordering the valley floor support big sagebrush. The uplands support scattered pinon and juniper stands, with an understory of big sagebrush. Upland flats, and areas in canyons and depressions, where wind-blown sands from the Mono Basin have accumulated, support big sagebrush and bitterbrush.

How This Survey Was Made

This is an Order 3 soil survey. It has followed the directives and guidelines in the Forest Service Manual and Handbooks and the concepts, procedures, and guidelines of the National Cooperative Soil Survey as specified in the Soil Survey Manual (6), the National Soils Handbook (5,11), and the soil classification system as stated in Soil Taxonomy (7).

Soil Scientists began the inventory by collecting, studying, and correlating soil genesis and morphology data, including lithological, geomorphological, topographical, climatic, vegetative data for the soil survey area and for adjoining areas.

This data and information were assimilated and transferred to a single base map of suitable scale and accuracy, forming the beginning soil map unit delineations, or a schematic map. With the schematic map and aerial photograph field sheets (stereo-pair coverage) in hand, a reconnaissance study of the survey area was made. The delineations on the schematic map were checked for accuracy of content and location. The aerial photos were studied stereoscopically and the photo images were compared to the conditions found on the ground to ensure that later recognition by photograph interpretation would be credible. Lithologic, geomorphic, soil, and vegetative characteristics were recorded in field notes, on the schematic map, and on the aerial photograph field sheets.

Using the augmented and corrected schematic map, field notes, and an understanding of how the photograph images relate to actual conditions on the ground, the soil scientists delineated map units on the aerial photographs. The map units corresponded to segments of the landscape having similar landform, vegetative cover, and soils as determined by a knowledge of ground conditions and by stereoscopic aerial photograph interpretation. The aerial photographs with the delineated map units and delineation symbols became the exploratory or preliminary soils map.

With the aerial photographs (exploratory soils maps) and a field stereoscope, the soil scientists examined on the ground as many delineations of each map unit as was possible, considering limited access in places and the time allowed to complete the survey. Map units were examined, studied, and described by aerial photograph interpretations and on-the-ground investigations.

Because the survey is Order 4 in intensity (12), and because of the time allotted for its completion, not every delineation of each map unit was visited and examined on the ground. Few delineations with no easy access were visited, but they were scrutinized by aerial photograph interpretation. Possibly one-third to one-half of the delineations on the field sheets and maps were not examined on the ground. Consequently, the data in this report are not suitable for project planning without field verification.

At each site that was visited and examined, individual soils were studied, named, described and classified, and enough data were collected to make interpretations and predictions concerning the use and management of each soil. However, the exact location of each soil was not delineated. The map units in most places consist of a group of soils on a particular landscape that has been delineated on the aerial photograph field sheets. Depending on the area location and extent of the individual soils that are components of the delineated map unit, a map unit is called a consociation, an association or a complex. The soil scientists made a field study and aerial photograph examination to estimate the percentage of each soil component in each map unit. The map units do not necessarily consist of similar soils. They consist of geographically associated soils that may be, and in places are, quite different in their characteristics and their suitability for use and management. For this reason also, the data in this report are not suitable for project planning without field verification.

The interpretations and predictions concerning use and management in this report are based on the soil scientists' knowledge and understanding of the conditions recognized and measured in the field. In classifying the soils, soil scientists can also, with acceptable reliability, bring information concerning use and management of a particular soil from other survey areas where the same soil occurs and has been recognized and studied. Some use and management interpretations and predictions should be considered as first or second approximations owing to the relatively few examinations and measurements that were made. This is still another reason that limits the data in this survey for project planning without field verification.

Despite the cautions that have been given concerning the use of data in this survey for project planning, the survey is adequate and reliable for its intended and designed purpose: a base for a forestwide system of land management planning.

General Soil Map Units

The general soil map shows map units which consist of many individual soils. Each map unit contains soils with similar parent rock material and similar soil temperature regimes. A map unit typically is made up of one or more soils of major extent and several soils of minor extent. Map units are named for the major soils occurring in the unit. The soils in one unit can occur in other units. The soils are classified at the family level or at a higher taxonomic level.

Soils of the Alluvial Plains - Moderate and Cool Soil Temperatures

Material from Granitic Rocks

1. Berent - Preston - Bluewing families

This map unit is in alluvial depressions and on sand dunes. Slope is 1 to 60 percent. Elevation is 3,800 to 8,000 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is big sagebrush and antelope bitterbrush. This unit comprises 2 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Typic Xerorthents, and the Trocken and Finley families.

Material from Other Rocks or Mixed Rocks

2. Mackey - Unionville - Wrango families

This map unit is on alluvial fans and terraces. Slope is 2 to 70 percent. Elevation is 3,800 to 8,500 feet. The mean annual precipitation is 6 to 11 inches. The typical vegetation is big sagebrush, goldenbush and Nevada Ephedra. This unit comprises 3 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Abgese, Trocken and Berent families.

3. Spanel - Trocken - Gol families

This map unit is on stable alluvial fans and terraces. Slope is 2 to 60 percent. Elevation is 3,800 to 10,100 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is Mormon Tea, shadscale and boxthorn. This unit comprises 3 percent of the survey area. The above-named components comprise most of

the unit, but there are also minor areas of the Bluewing family and Durargidic Argixerolls.

Soils of the Temperate Uplands - Moderate and Cool Temperatures

Volcanic Soil Parent Material

4. Rock outcrop, volcanic - Risue - Toeja families

This map unit is on lava flows and mountains. Slope is 1 to 80 percent. Elevation is 5,100 to 10,000 feet. The mean annual precipitation is 8 to 12 inches. The typical vegetation is big sagebrush, singleleaf pinyon pine, curl-leaf mountain mahogany and antelope bitterbrush. This unit comprises 13 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Abgese, Preston, Merlin, Tweedy, Unionville, Berent, Bearskin, Credo, Wenzel, Berning, St. Marys and Simpson families.

Limestone, Dolomite or Marble Soil Parent Material

5. Rock outcrop, limestone - Theriot - Sanpete families

This map unit is on colluvial and residual positions on mountains, in the Inyo Mountains. Slope is 2 to 80 percent. Elevation is 4,100 to 8,500 feet. The mean annual precipitation is 6 to 9 inches. The typical vegetation is shadscale, greenfire and boxthorn. This unit comprises 10 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of Lithic Camborthids.

6. Rock outcrop, limestone - Hymas - Beveridge families

This map unit is on colluvial and residual positions on mountainsides, in the White Mountains. Slope is 15 to 80 percent. Elevation is 5,600 to 11,700 feet. The mean annual precipitation is 10 to 11 inches. The typical vegetation is singleleaf pinyon pine and juniper. This unit comprises 6 percent of the survey area. The above-named components comprise most of the unit, but there are also minor areas of the Swift Creek family.

Plutonic and Noncarbonate Sedimentary and Metamorphic Rock Soil Parent Materials

7. Rock outcrop, granitic - Washoe - Mexispring families

This map unit is on colluvial and alluvial positions on lower mountains, at elevations of 8,500 feet or less. Slope is 2 to 80 percent. Elevation is 3,800 to 8,500 feet. The mean annual precipitation is 6 to 10 inches. The typical vegetation is big sagebrush, singleleaf pinyon pine and Mormon Tea. This unit comprises 16 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Mulett, Yuko, Checkett, Trocken, Finley, Midas, Moano, Mackey, Cath and Blackston families.

8. Rock outcrop, granitic - Hartig - Basket families

This map unit is on colluvial and alluvial positions on mid-mountains, at elevations of 12,700 feet or less. Slope is 5 to 80 percent. Elevation is 5,800 to 12,700 feet. The mean annual precipitation is 8 to 12 inches. The typical vegetation is singleleaf pinyon pine, big sagebrush, antelope bitterbrush and curleaf mountain mahogany. This unit comprises 36 percent of the survey

area. The above-named components comprise most of the unit, but there are also significant areas of the Dunul, Slinger, Bregar, Soakpak, Packham, Brad, Bondbranch, Spaa, Mascamp, Sumine, Simpson and Vipont families, and Typic Haplargids.

Soils of the Cold Uplands - Cold Soil Temperatures

Plutonic, Sedimentary and Metamorphic Rock Soil Materials

9. Pergelic Cryoborolls - Supervisor family - Rock outcrop, granitic

This map unit is on colluvial and alluvial positions on high mountains, at elevations greater than 8,800 feet. Slope is 5 to 80 percent. Elevation is 8,800 to 14,250 feet. The mean annual precipitation is 11 to 18 inches. The typical vegetation is goldenbush, mat eriogonum, bluegrass, lupine and Bristlecone Pine. This unit comprises 11 percent of the survey area. The above-named components comprise most of the unit, but there are also significant areas of the Soakpak and Bartine families.

119°15' 119°00' 118°45' 118°30' 118°15' 118°00'

38°00'

38°00'

37°45'

37°45'

37°30'

37°30'

37°15'

37°15'

37°00'

37°00'

36°45'

36°45'

36°30'

36°30'

36°15'

36°15'

36°00'

36°00'

GENERAL SOILS MAP EAST HALF INYO NATIONAL FOREST, CALIFORNIA

Soils of Alluvial Plains--
Moderate and Cool Soil Temperatures

Material from Granitic Rocks

1. Berent-Preston-Bluewing families
Material from Other Rocks, or Mixed
2. Mackey-Unionville-Wrango families
3. Spanel-Trocken-Gol families

Soils of Temperate Uplands--
Moderate and Cool temperatures

Volcanic Soil Parent Material

4. Rock outcrop, volcanic-Risue-Toeja families

Limestone,Dolomite, or Marble Soil Parent Material

5. Rock outcrop,limestone-Theriot-Sanpete families
6. Rock outcrop,limestone-Hymas-Beveridge families

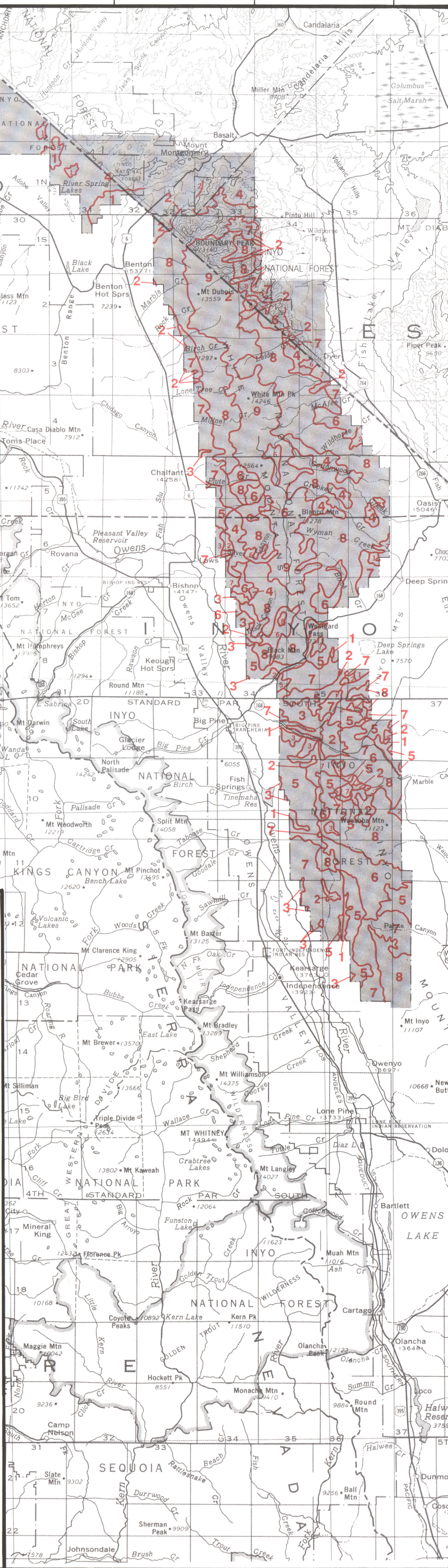
Plutonic and Noncarbonate Sedimentary and
Metamorphic Rock Soil Parent Materials

7. Rock outcrop, granit-Washoe-Mexispring families
8. Rock outcrop, granitic-Hartig-Basket families

Soils of the Cold Uplands--
Cold Soil Temperatures

Plutonic, Sedimentary, and Metamorphic
Rock Soil Materials

9. Pergelic Cryoborolls-Supervisor family-
Rock outcrop, granitic



Detailed Soil Map Units

The map units on the soil maps at the back of this report show the kind of soils in the survey area. Table 2 gives the acreage and proportionate extent of each map unit. Each map unit on the soil maps represents an area on the landscape and consists of one or more soils or miscellaneous landtypes for which the unit is named. The map unit descriptions and management interpretations, which are in tabular format, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They can also be used to plan the management needs for those uses.

In this survey, the individual soils (components of map units) were recognized and classified to families or phases of families or to the subgroup level (see "Classification of the Soils"). Soils that have profiles somewhat alike make up a soil family. Soil families are established within a subgroup primarily on the basis of physical and chemical properties that affect use and management. Soils of a family can also differ in slope, wetness, or degree of erosion, and because of such differences, a family is divided into soil phases.

Many map units are made up of two or more major soils. Table 1 lists for each soil, those map units in which the soil occurs as a major component. It also lists where each soil occurs as a named inclusion to a map unit. These map units are called soil complexes or soil associations. A soil complex consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. A soil association is made up of two or more geographically associated soils that are shown as one unit on the maps.

Because of present or anticipated uses, it was considered impractical to map the soils separately. In addition, some map units include miscellaneous areas as components. Rock outcrop is an example; it has little or no soil and supports little or no vegetation.

Definitions and Criteria - Soil Map Unit Descriptions and Soil Properties

The following are explanations of entries used in detailed soil map unit descriptions.

Map unit symbol and name. A numerical symbol is used to designate areas of each map unit on the soil maps. The symbol corresponds to the symbol preceding the map unit name in the map unit descriptions. The map unit consists of soil components or miscellaneous areas or both.

Elevation. The range of elevation (in feet) for the soil map unit.

Annual precipitation. The average annual precipitation (in inches) for the map unit.

Soil Map unit components consist mostly of soil families but may include subgroups or higher soil taxa and miscellaneous land types.

Approximate proportion is the approximate percentage of each soil component or miscellaneous land type making up the map unit.

Landscape position describes the type of landform or surface on which the components are found.

Slope is the slope range for each soil component, expressed in percent slope.

Typical vegetation is the vegetation typically found in each of the soil components of the map unit.

Soil profile description is an abridged version of the more detailed soil profile descriptions in the section "Taxonomic Unit Descriptions". This description combines horizons and includes the thickness, dry color, texture, structure, rock fragment content and reaction (pH). Miscellaneous landtypes are also described here. Included are the following layers:

Surface Layer. The uppermost part of the soil, ordinarily removed in tillage, or its equivalent in uncultivated soils. Frequently designated the "A horizon".

Subsoil. The soil between the surface layer and the uppermost substratum. The subsoil consists of all parts of the B horizon above a depth of 2 meters (80 inches) and any part of the A or C horizon between the surface layer and a depth of 1 meter (40 inches) or a more shallow substratum.

Substratum. A layer below a depth of one meter (40 inches), or beneath the solum if the lower part of the solum is between one and two meters (40 to 80 inches) deep. Any part of the solum below two meters (80 inches) is considered substratum. Bedrock, hardpan, and unconsolidated geologic materials that are in contrasting particle-size classes relative to the surface soil or solum are substratum regardless of depth, even within one meter of the ground surface.

Restrictive Layer Depth is a restrictive layer which occurs within the upper 60 inches of the soil profile. Re-

restrictive layers impede or stop downward water movement and root penetration. Types of restrictive layers used in this report are:

- DP – Duripan or Hardpan
- FB – Fractured bedrock
- HB – Hard, unfractured bedrock
- PARA – Paralithic contact (bedrock)

Effective rooting depth is the range of depth that the main body of plant roots extend to, generally to shallow bedrock or to a maximum depth of 60 inches. Other limiting layers include hardpans, claypans, or weathered bedrock.

Available water capacity (AWC) is the capacity of the soil to store water for use by most plants. It commonly is defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is expressed as total inches of water within the effective rooting depth or to a depth of 60 inches. The following four classes of AWC are used in this survey:

Very low	0 to 2 inches
Low	2 to 4 inches
Moderate	4 to 8 inches
High	more than 8 inches

Water retention class is based on the available water capacity for plants of a typical soil profile to a depth of 20 inches or to bedrock, whichever is less. This moisture content is used in evaluating soils for revegetation according to the probability of survival of seedlings.

There are three water retention classes. The soils in class 1 have an available water capacity of more than 2.4 inches. Plantings on these soils have a high probability of survival. The soils in class 2 have an available water capacity of 1.2 to 2.4 inches. Some problems will be encountered in establishing plantings. The soils in class 3 have an available water capacity of less than 1.2 inch. Plantings on these soils have little chance of success unless intensive management or mitigation measures are applied.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned one of four groups. The soils are grouped according to the intake of water when they are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Low runoff potential. Soils having high rates of infiltration and water transmission when wet. They are mostly deep, well drained to excessively drained sands and gravel.

Group B. Moderately low runoff potential. Soils having moderate rates of infiltration and water transmission when wet. They are mostly moderately deep and deep, moderately well drained and well drained soils, moderately fine to moderately coarse textured and have moderately slow to moderately rapid permeability.

Group C. Moderately high runoff potential. Soils having slow rates of infiltration and water transmission when wet. They belong mostly to one of two categories. Those in the first category are mostly well drained and moderately well drained soils that have a slowly or very slowly permeable layer (such as claypan or hardpan or massive bedrock) at moderate depth (20-40 inches). Those soils in the second category generally have moderately fine or fine textures or a moderately high water table and may be somewhat poorly drained. This group also includes shallow soils over hard but highly fractured bedrock that allows moderate water transmission.

Group D. High runoff potential. Soils having very slow rates of infiltration and water transmission when wet. They are mostly fine-textured soils that have high shrink-swell potential, soils that have a permanently high water table, soils that have a claypan or a clay layer near the surface, or shallow soils over impervious material.

Permeability is the quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. The measure here is based on the least pervious soil horizon. Terms describing permeability are: Very slow (less than 0.06 inch), slow (0.06 to 0.20 inches), moderately slow (0.2 to 0.6 inches), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20.0 inches), and very rapid (more than 20.0 inches).

Drainage class refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation, but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized.

Excessively drained. Water is removed from the soil very rapidly. Excessively drained soils commonly are very coarse textured, rocky, or shallow. Some

are steep. All are free of the mottling related to wetness.

Somewhat excessively drained. Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained. Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils commonly are medium textured. They are mainly free of mottling.

Moderately well drained. Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. The soils commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained. Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained. Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, or nearly continuous rainfall, or a combination of these.

Very poorly drained. Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Very poorly drained soils commonly are level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Runoff classes are used to estimate the relative speed at which water, in the form of precipitation or run-on from an adjacent area flows over the soil surface without infiltrating. The rate and amount of runoff are determined by internal and external characteristics

of the soil and by climate and plant cover. Runoff can be significantly different on a soil under natural cover, under cultivation, and under different kinds of management. Differences in runoff can also be caused by differences in topography. Rainfall intensity influences runoff. Soils may have a high rate of runoff when frozen.

The six classes of runoff are:

Ponded. Little of the precipitation and run-on escapes as runoff, and free water stands on the surface for significant periods. The amount of water that must be removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level to nearly level depressional soils, and water depth may fluctuate greatly.

Very Slow. Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils commonly are level or nearly level or are very open and porous.

Slow. Surface water flows away slowly enough that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium. Surface water flows away fast enough that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid. Surface water flows away fast enough that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate to slow rates of absorption.

Very Rapid. Surface water flows away so fast that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Maximum Erosion Hazard

Many land use activities have the potential to cause erosion rates to exceed natural soil erosion or soil formation rates. Potential consequences of accelerated erosion include reductions in the productive capacity of the soil and adverse effects on water quality. Many interrelated factors are evaluated in an EHR system (10) to determine whether land use activities would cause accelerated erosion, and to what degree accelerated erosion would cause adverse effects. It is designed to appraise the relative risk of accelerated sheet and rill erosion. The system does not rate gully erosion, dry ravel, wind erosion, nor mass wasting.

The adjective erosion hazard ratings are described below in terms of the likelihood and consequences of accelerated erosion. As the risk of accelerated erosion increases, so does the likelihood that accelerated erosion will exceed soil formation rates. The risk and consequence becomes especially critical for shallow and moderately deep soils over consolidated materials.

The maximum EHR are based on little or no vegetative cover present and on the long-term average occurrence of 2-year, 6-hour storm events. Erosion hazard risks are greater when storm frequency, intensity and/or duration exceed long-term average occurrence, and risks are less when occurrence is below "average". The risks and consequences for adjective erosion hazard ratings are described below.

Low EHR. Accelerated erosion is not likely to occur, except in the upper part of the Low EHR numerical range, or during periods of above average storm occurrence. If accelerated erosion does occur, adverse effects on soil productivity and to nearby water quality are not expected. Erosion control measures are usually not needed for these areas.

Moderate EHR. Accelerated erosion is likely to occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality may occur for the upper part of the Moderate EHR numerical range, or during periods of above average storm occurrence. The need for erosion control should be evaluated for these areas. A wide selection of measures and application methods are available.

High EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality are likely to occur, especially during periods of above average storm occurrence. Erosion control is necessary for these areas to prevent accelerated erosion. The selection of measures and methods of application are somewhat limited.

Very high EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity and to nearby water quality are very likely to occur, even during periods of below average storm occurrence. Erosion control is essential for these areas to prevent accelerated erosion. The selection of measures and methods of application are limited.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on the percentage of silt, sand and organic matter (up to 4 percent) and on the soil structure and permeability. Values of K in the survey area range from 0.02 to 0.43. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

T - Value is the maximum rate of soil erosion, whether from rainfall or wind, which will permit a high level of plant productivity to be sustained economically and indefinitely. It is expressed in tons per acre per year or in inches per year loss:

Tons/Acre/Year	Inches/Year
1	0.0064
2	0.0128
3	0.0192
4	0.0256
5	0.0320

Wind Erodability Group (WEG) is the susceptibility of the surface of the soil to erosion by wind. It is related to the percentage of dry, non-erodible soil aggregates greater than 0.84 mm in diameter. The following table is a general guide for determining WEG:

WEG	Adjective Rating	Texture of Surface Inch of Soil
1	High	Very fine sand, fine sand and medium sand
2	High	Loamy sand, loamy fine sand
3	Moderate	Very fine sandy loam, fines sandy loam and sandy loam.
4	Low	Clay, silty clay, noncalcareous clay loam, and silty clay loam with more than 35% clay.
4L	Moderate	Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35% clay content.
5	Low	Noncalcareous loam and silt loam with less than 20% clay content; sandy clay loam, sandy clay.
6	Low	Noncalcareous loam and silt loam with more than 20% clay content; noncalcareous clay loam with less than 35% clay content.
7	Low	Very wet or stony; not subject to wind erosion.

Included Areas comprise the other kinds of soils in the map unit that are not named as a component part because they constitute too small a percentage of the unit. Included areas are given because some do affect management significantly and the recognition of all of them will assist with more detailed mapping in the future.

Remarks are comments that are unique to the particular map unit, important to the management of the map unit, or they add further explanation to something previously stated in this section.

Definitions and Criteria - Soil Map Unit Management Interpretations

Soil manageability. Certain features of the land affect the relative ease of management with mechanized equipment. Soil manageability classification rates soils and their topography on the basis of features that reduce the ease of equipment operations and features that increase the need for soil protection measures.

Soil manageability classes are ratings that are applied to the individual components of a soil map unit. Manageability classes are useful for providing specific information about individual soils. Because map units may contain soils with contrasting class ratings, soil manageability groups are used to provide general ratings that

apply to an entire map unit. Manageability groups are useful for providing general information for large areas.

Soil manageability classes are represented by the numerals 1 to 4. Class 1 is the easiest to manage and class 4 is the most difficult. Letter symbols are added to classes 2, 3, and 4 to identify specific soil problems affecting management. Soil manageability classes are described as follows:

Class 1 - Easy to manage. Soils in this class are on stable slopes with gradients ranging up to about 30 percent. They are moderately deep or deep and do not have more than slight management problems. No management option modifiers apply to this class.

Class 2 - Readily manageable. Soils in this class are mostly on slopes of less than 30 percent and have one or more moderate management limitations, such as a moderate erosion hazard.

Class 3 - Moderately difficult to manage. Soils in this class are on steep slopes that are mostly between 30 and 60 percent, or they have a major management limitation, or both.

Class 4 - Very difficult to manage. Soils in this class are on very steep slopes (more than 60 percent),

or they have two or more other major management limitations.

Letter symbols are used to express the severity of potential problems in soil management. Major manage-

ment option modifiers are identified by capital letters and moderate management modifiers are indicated by lowercase letters. The criteria and symbols for management option modifiers for each soil characteristic or topographic feature are listed in table 1.

Table 1. - Soil Features Affecting Management

Soil features	Major modifiers	Moderate modifiers
Slope gradient	G ... Mostly more than 60 percent	g ... Mostly between 30 and 60 percent
Slope stability	S ... Low	s ... Moderate
Maximum erosion hazard	E ... High or very high	e ... Moderate
Soil Depth	D ... Less than 10 inches	d ... 10 to 20 inches
AWC, upper 20 inches	P ... Less than 1.2 inches	p ... 1.2 to 2.4 inches
Wetness	W ... Poorly drained	w ... Somewhat poorly drained
Rock outcrop or surface boulders	X ... More than 15 percent of surface area	x ... 3 to 15 percent of surface area

Management option modifiers are chosen in the order in which they are listed. One symbol can be chosen from each of the following groups: (1) symbols G, S, and E (and their lower case forms); (2) symbols D and P; and (3) symbols W and X. Within each group, symbols for major management limitations take precedence over moderate limitations.

Soil manageability groups are defined by the mix of soil manageability classes that occurs in a soil map unit. They are designated by Roman numerals to distinguish them from soil manageability classes. Only one group applies to a soil map unit, whereas as many classes may apply as there are major components in the map unit. The soil manageability groups in the survey area are defined as follows:

Group I - Map unit is predominantly class 1. Less

than 20 percent of the unit is class 3 or class 4. The unit may be no more than 50 percent class 2, or combinations of classes 2, 3, and 4.

Group II - Map unit is predominantly class 2. Less than 20 percent of the unit is class 4. Less than 50 percent of the unit is class 3 or a combination of classes 3 and 4.

Group III - Map unit is predominantly class 3. Less than 40 percent of the unit is class 4.

Group IV - Map unit is at least 40 percent class 4.

A soil map unit is placed in the group with the lowest numeral if group definitions allow the unit to be placed in more than one soil manageability group.

Range Interpretations

Range Productivity is an estimate of the total annual production of forage grasses in pounds per acre (air-dry weight). The estimates generally are based on professional judgement because little if any field data or yield studies were available. These estimates can be verified through project monitoring activities and ecosystem classification.

Range Suitability is the suitability of a unit for grazing. The suitability for range is indicated by summer-autumn, summer and unsuitable. A rating of summer-autumn means that soils are capable of producing forage for grazing in the summer and autumn. A rating of summer means that the soils are capable of producing forage in the summer. A rating of unsuitable means that the unit is not capable of producing forage.

Most Limiting Factors - The "most limiting factors" for use as range are listed for units suited to range. If the unit is used for range, "Rock outcrop" indicates the percent of non-productive land; "shallow soils" indicates the percent of soils that are less than 20 inches deep; "plant competition" indicates that forage generally has to compete with trees and non-palatable shrubs for sunlight, water and soil nutrients; "steep slopes" indicates that the unit has slopes of 30 to 50 percent; "very steep slopes" indicates that the unit has slopes of more than 50 percent.

Recreation Interpretations

Limitations for Camp Areas, Picnic Areas and Paths and Trails - The suitability for recreational purposes is indicated by "slight", "moderate" or "severe" restrictions. The object of the ratings is not to dictate management decisions for an area, but rather, to show what factors, if any, must be overcome in utilizing these areas for recreational uses. Restrictive features are listed for severe and moderate ratings. Only the most restrictive features are listed. Lesser restrictive features are also important, and should be identified and addressed.

Soils are rated in their "natural" state. That is, no unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use.

"Slight" is the rating given soils that have properties favorable for the use. The degree of limitation is minor and can easily be overcome. Good performance and low maintenance can be expected.

"Moderate" is the rating given soils that have properties moderately favorable for use. This degree of limitation

can be overcome or modified by special planning, design or maintenance. During some part of the year, the expected performance of the structure or other planned use is somewhat less desirable than for soils rated slight. Some soils rated moderate require treatment such as artificial drainage, control of runoff to reduce erosion, extended septic tank absorption fields, extra excavation, or some modification of certain features through the manipulation of the soil. For these soils, modification is needed for those construction plans generally used for soils of slight limitation. Modification may include specially designed foundations, extra reinforcement of structures, sump pumps and the like.

"Severe" is the rating given soils that have one or more properties unfavorable for the rated use, such as steep slopes, bedrock near the surface, flooding, high shrink-swell potential, a seasonal high water table or low strength. This degree of limitation generally requires major soil reclamation, special design or intensive maintenance. Some of these soils, however, can be improved by reducing or removing the soil feature that limits its use, but in most situations, it is difficult and costly to alter the soil or to design a structure so as to compensate for a severe degree of limitation.

The restrictive features for the survey area are:

Depth to Rock - Applied only to Camp Area interpretations, as applicable. Soils less than 10 inches deep are rated severe. Soils 10 inches or deeper do not adversely restrict this use.

Large Stones - Applies to all of the recreation uses listed. Large stones are rock fragments which are greater than 3 inches in diameter.

Slope - Slope group restrictions are used in all of the interpretations. Severity of restriction increases with increasing percent slope.

Small Stones - This restriction modifier is used in all recreation interpretations, where applicable. Small stones are 0.8 to 3 inches in diameter.

Too Clayey - This restriction is used in all recreation interpretations, as applicable. Soil surface types considered restrictive are sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay and clay textures.

Too Sandy - This restriction modifier is used in all recreation interpretations, as applicable. Soil surface types considered restrictive are loamy coarse sand, loamy sand, loamy fine sand, very fine sand, coarse sand, sand and fine sand.

Engineering Interpretations

Engineering Soil Classification - There are several engineering soil classification systems. This report uses the two most common ones:

Unified Soil Classification or ASTM (American Society for Testing Materials) is a system that classifies soil according to those properties that affect their use as construction material. This system was developed by Arthur Casagrande and modified by the Bureau of Reclamation and the Army Corps of Engineers so that it now applies to embankments and foundations, as well as to roads and air fields. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, and according to the plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC. Silty and clayey soils are identified as ML, CL, OL, MH, CH, and OH. Highly organic soils are identified as Pt. Soils exhibiting engineering properties of two groups can have a dual classification (for example, SW-SM).

AASHTO Soil Classification (American Association of State Highway Officials) is a system that classifies soil according to those properties that affect their use in highway construction and maintenance. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, and according to the plasticity index and the liquid limit. Sandy, stony and gravelly soils are identified as A-1-a and A-1-b. Fine sands are identified as A-3. Silty or clayey gravel and sand are identified as A-2-4, A-2-5, A-2-6 and A-2-7. Silty soils are identified as A-4 and A-5. Clayey soils are identified as A-7-5 and A-7-6. Soils exhibiting engineering properties of more than one group can have more than one classification.

Soil Suitability for Selected Engineering Uses

- The suitability for selected engineering purposes is indicated by "good", "fair" or "poor". An additional rating of "unsuited" is also used for rating an area as a source of sand. Soils are rated in their "natural" state. That is, no unusual modifications of the soil site or materials are made other than that which is normal practice for the rated use.

A rating of *good* means that the soils have properties favorable for the intended use. Good performance and low maintenance can be expected.

A rating of *fair* means that the soil is moderately favorable for the intended use. One or more soil properties make these soils less desirable than those rated good.

A rating of *poor* means that the soil has one or more properties unfavorable for the intended use. Overcoming the unfavorable property requires special design, extra maintenance or costly alteration.

A rating of *unsuited* means that the expected performance of the soil would be unacceptable for the intended use.

The restrictive features for engineering in the survey area are:

Area Reclaim - This is an area which is difficult to reclaim after the removal of soil materials for construction or other uses. Revegetation and erosion control are extremely difficult. This feature is based on soil depth, and applies to interpretations for Topsoil and Roadfill.

Excess fines - This is an area in which the soils have excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Low Strength - This is an area in which the soils have inadequate strength for supporting loads. This restriction applies only to interpretations for Roadfill.

Large Stones - This applies to all engineering uses addressed in Management Interpretations section of this report. Large stones are rock fragments which are greater than 3 inches in diameter.

Slope - Slope group restrictions are used only in interpretations for Topsoil and Roadfill. The severity of the restriction increases with an increase in slope.

Small Stones - This restriction modifier applies only to interpretations for Topsoil, where applicable. Small stones are 0.8 to 3.0 inches (2.0 to 7.6 cm.) in diameter.

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101 - Abgese - Berent - Mackey families complex, 2 to 15 percent slopes

Elevation: 5,100 to 9,050 feet Annual Precipitation: 10 inches

Soil Map Unit Components	Abgese family	Berent family	Mackey family
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Crests and sideslopes of alluvial fans	Drainages and sandy washes	Modern drainages
Slope	2 to 5 percent	2 to 15 percent	2 to 15 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Singleleaf Pinyon Pine (<i>Pinus monophylla</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown and brown loamy sand and gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam and gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline	—	3 to 42 inches; brown and yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown and light yellowish brown loamy fine sand, medium sand and gravelly sandy loam; massive; moderately alkaline	42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; strongly effervescent, moderately alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	Greater than 60 inches
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	20 to 40 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.7 to 3.6 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	2 (1.2 to 1.6 inches)
Hydrologic Soil Group	B	A	B
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	2.0 to 6.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Slow	Slow to Medium	Slow to Medium
Max Erosion Hazard	Moderate	High	High
Erosion Factor (k)			
Surface	0.15 (Low)	0.15 (Low)	0.05 (Low)
Subsurface	0.17 (Low)	0.10 (Low)	0.10 (Low)
T Value	3	4	4
Wind Erodability Group	3	2	3

101 - Abgese - Berent - Mackey families complex (continued)

Soil Manageability Group Class	III 2ep	III 3Ep	III 3Ep
Range Interpretations			
Productivity (lb/acre)	500 to 700	300 to 400	300 to 400
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; high erosion hazard	Plant competition; high erosion hazard	Plant competition; high erosion hazard
Recreation Interpretations - Limitations for			
Camp Areas	Slight	2-8% slopes: Moderate - Too sandy 8-15% slopes: Moderate - Too sandy; slope	2-8% slopes: Moderate - Small stones 8-15% slopes: Moderate - Small stones; slope
Picnic Areas	Slight	Severe: Too sandy	2-8% slopes: Moderate - Small stones 8-15% slopes: Moderate - Small stones; slope
Paths & Trails	Slight	Moderate: Too sandy	Moderate: Small stones
Engineering Interpretations			
Unified Class			
Surface	SM-SC	SM; SW-SM	SM
Subsoil	SM-SC	—	SW-SM; SM-SC
Substratum	SM	SM; SW-SM	GW-GM
AASHTO Class			
Surface	A-2-4	A-2-4	A-1-b; A-2-4
Subsoil	A-2-4	—	A-1-a; A-1-b; A-2-4
Substratum	A-1-b; A-2-4	A-2-4	A-1-a; A-1-b; A-2-4
Suitability for			
Sand	Unsuited	Poor: Excess fines	Unsuited
Gravel	Unsuited	Unsuited	Unsuited
Topsoil	Fair: Small Stones	2-8% slopes: Fair - Too sandy. 8-15% slopes: Fair - Slope; Too sandy	Poor: Small stones
Roadfill	Good	Good	Good

Included Areas & Remarks

Included in this map unit are small areas of the Berning and Midas families on old alluvial fans; and the Abgese, Berent and Mackey families in their respective landscape positions, but on 15 to 30 percent slopes. Included areas make up approximately 30 percent of the map unit area.

102 - Abgese - Berent - Toeja families association, 2 to 30 percent slopes

Elevation: 6,680 to 7,640 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Abgese family	Berent family	Toeja family
Approx Proportion	40 percent	25 percent	15 percent
Landscape Position	Southerly and westerly-facing sideslopes of basalt flows	Superimposed on valleys between basalt flows	Northerly and easterly-facing sideslopes of basalt flows
Slope	15 to 30 percent	2 to 15 percent	15 to 30 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Curlleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	1 to 0 inch; Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam & gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline		12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand & gravelly sandy loam; massive; moderately alkaline	22 inches; weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	21 to 24 inches PARA
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	21 to 24 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.4 to 3.4 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	1 to 2 (2.1 to 2.7 inches)
Hydrologic Soil Group	B	A	C
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid	Slow to Medium	Rapid
Max Erosion Hazard	Moderate to High	High	High
Erosion Factor (k)			
Surface	0.15 (Low)	0.15 (Low)	0.10 (Low)
Subsurface	0.17 (Low)	0.10 (Low)	0.28 (moderate)
T Value	3	4	2
Wind Erodability Group	3	2	8

102 - Abgese - Berent - Toeja families association (continued)

Soil Manageability Group Class	III 2epx	III 3Epx	III 3Ex
Range Interpretations			
Productivity (lb/acre)	500 to 700	300 to 400	600 to 1000
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 10% rock outcrop; high erosion hazard	Plant competition; 10% rock outcrop; high erosion hazard	Plant competition; 10% rock outcrop; high erosion hazard
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope	2-8% slopes: Moderate - Too sandy 8-15% slopes: Moderate - Too sandy; slope	Severe: Slope
Picnic Areas	Severe: Slope	Severe: Too Sandy	Severe: Slope
Paths & Trails	15-25% slopes: Moderate - Slope 25-30% slopes: Severe - Slope	Moderate: Too Sandy	15-25% slopes: Moderate - Slope; large stones 25-30% slopes: Severe - Slope
Engineering Interpretations			
Unified Class	SM-SC	SM, SW-SM	SM
Surface	SM-SC	—	SM
Subsoil	SM	SM; SW-SM	—
Substratum			
AASHTO Class			
Surface	A-2-4	A-2-4	A-4
Subsoil	A-2-4	—	A-2-7
Substratum	A-1-b; A-2-4	A-2-4	—
Suitability for			
Sand	Unsuited	Poor: Excess fines	Poor: Excess fines
Gravel	Unsuited	Unsuited	Unsuited
Topsoil	Poor: Slope	2-8% slopes: Fair - Too sandy 8-15% slopes: Fair - slope; Too sandy	Poor: Slope; Small stones
Roadfill	15-25% slopes: Fair - slope 25-30% slopes: Poor - slope	Good	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of basalt rock outcrop, on sideslopes of basalt flows; the Abgese and Berent families, 30 to 60 percent slopes, on mountainsides; and a soil similar to the Berent family, but less than 1 foot to the underlying Abgese and Toeja families, 15 to 30 percent slopes, on toeslopes. Included areas make up approximately 20 percent of the map unit area.

103 - Abgese - Berent- Toeja families associations, 30 to 70 percent slopes

Elevation: 6,640 to 7,530 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Abgese family	Berent family	Toeja family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Southerly and westerly-facing sideslopes of basalt flows	Superimposed in valleys between basalt flows	Northerly and easterly-facing sideslopes of basalt flows
Slope	30 to 70 percent	15 to 30 percent	30 to 70 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Curleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 13 inches; pale brown and brown loamy sand and gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline	1 to 0 inch, Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline
Subsoil	5 to 16 inches; yellowish brown sandy loam and gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline	—	12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline
Substratum	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	13 to 60 inches; pale brown and light yellowish brown loamy fine sand, medium sand and gravelly sandy loam; massive; moderately alkaline	22 inches; Weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	Greater than 60 inches	21 to 24 inches PARA
Effective Rooting Depth (inches)	40 to 60 inches	20 to 40 inches	21 to 24 inches
Available Water Capacity	Moderate (4.6 to 5.7 inches)	Low to Mod. (3.8 to 5.0 inches)	Low (2.4 to 3.4 inches)
Water Retention Class	2 (1.7 to 2.1 inches)	2 to 3 (1.1 to 1.6 inches)	1 to 2 (2.1 to 2.7 inches)
Hydrologic Soil Group	B	A	C
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to very rapid	Rapid	Rapid to very rapid
Max Erosion Hazard	High	High	High to very high
Erosion Factor (k)			
Surface	0.15 (low)	0.15 (low)	0.10 (low)
Subsurface	0.17 (low)	0.10 (low)	0.28 (moderate)
T Value	3	4	2
Wind Erodability Group	3	2	8

103 - Abgese - Berent- Toeja families associations (continued)

Soil Manageability
Group
Class

III
3Egpx

III
3Epx

III
3Egx

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 400

600 to 1000

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope; Too sandy

Severe: Slope

Paths & Trails

Severe: Slope

15-25% slopes:
Moderate - slope; Too sandy
25-30% slopes:
Severe slope

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SM-SC

SM; SW-SM

SM

Subsoil

SM-SC

—

SM

Substratum

SM

SM; SW-SM

—

AASHTO Class

Surface

A-2-4

A-2-4

A-4

Subsoil

A-2-4

—

A-2-7

Substratum

A-1-b; A-2-4

A-2-4

—

Suitability for

Sand

Unsuited

Poor: Excess fines

Poor: Excess fines

Gravel

Unsuited

Unsuited

Unsuited

Topsoil

Poor: Slope

Poor: Slope

Poor: Slope; Small stones

Roadfill

Poor: Slope

15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Poor: Slope; Area reclaim

Included Areas & Remarks

Included in this map unit are small areas of basalt rock outcrops and cinder cones on ridges and mountainsides; and soil similar to the Berent family, but less than 1 foot to underlying Abgese and Toeja families, 15 to 30 percent slopes, on toeslopes. Included areas make up approximately 20 percent of the map unit area.

104 - Basalt flow

Elevation:

Annual Precipitation:

Soil Map Unit
Components

—

Approx Proportion

—

Landscape Position

—

Slope

—

Typical Vegetation

—

Soil Profile Description

Surface Layer

Basalt flows consist of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants.

Subsoil

—

Substratum

—

Soil Properties

Restrictive Layer Depth

—

Effective Rooting
Depth (inches)

—

Available Water
Capacity

—

Water Retention Class

—

Hydrologic Soil Group

—

Permeability (in./hr.)

—

Drainage Class

—

Runoff

—

Max Erosion Hazard

—

Erosion Factor (k)

Surface

—

Subsurface

—

T Value

—

Wind Erodability
Group

—

104 - Basalt flow (continued)

Soil Manageability

Group

—

Class

—

Range Interpretations

Productivity (lb/acre)

—

Suitability

—

Most Limiting Factors

—

Recreation Interpretations - Limitations for

Camp Areas

—

Picnic Areas

—

Paths & Trails

—

Engineering Interpretations

Unified Class

Surface

—

Subsoil

—

Substratum

—

AASHTO Class

Surface

—

Subsoil

—

Substratum

—

Suitability for

Sand

—

Gravel

—

Topsoil

—

Roadfill

—

Included Areas & Remarks

105 - Basket - Bondranch families complex, 15 to 30 percent slopes

Elevation: 6,900 to 9,770 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Basket family

50 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus Monophylla*);
Big Sagebrush (*Artemisia tridentata*) Antelope
Bitterbrush (*Purshia tridentata*)

Bondranch family

30 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Mormon Tea (*Ephedra* spp.)

Soil Profile Description

Surface Layer

0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral.

0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium & coarse subangular blocky structure; neutral

Subsoil

28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral

5 to 16 inches; brown & yellowish brown gravelly loam, moderate medium subangular blocky structure; neutral.

Substratum

57 inches; hard metasedimentary bedrock

16 inches; hard metamorphosed cambrian marine bedrock

Soil Properties

Restrictive Layer Depth

25 to 57 inches HB

12 to 20 inches HB

Effective Rooting Depth (inches)

40 to 57 inches

12 to 20 inches

Available Water Capacity

Very low to low (1.2 to 3.4 inches)

Very low to low (1.2 to 2.7 inches)

Water Retention Class

2 (1.2 to 1.5 inches)

1 to 2 (1.2 to 2.7 inches)

Hydrologic Soil Group

B

D

Permeability (in./hr.)

0.2 to 0.6

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate to High

High

Erosion Factor (k)

Surface

0.05 (low)

0.05 (low)

Subsurface

0.10 (low)

0.28 (moderate)

T Value

4

1

Wind Erodability Group

8

8

105 - Basket - Bondranch families complex (continued)

Soil Manageability Group Class

II
2ep

II
3Edp

Range Interpretations

Productivity (lb/acre)

400 to 600

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition, 30% shallow soils; high erosion hazard

Plant competition, 30% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; small stones

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; large & small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class

Surface

GC

SC

Subsoil

GM; GW-GM

SC

Substratum

—

—

AASHTO Class

Surface

A-2-4

A-4

Subsoil

A-2-6

A-4

Substratum

—

—

Suitability for

Sand

Poor: Excess fines

Unsuited

Gravel

Poor: Excess fines

Unsuited

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones; area reclaim

Roadfill

15-25% slopes:
Fair - slope; area reclaim
25-30% slopes:
Poor - slope

15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Basket and Bondranch families on 30 to 60 percent slopes; a soil similar to the St. Marys family, but with less than 35 percent rock fragments in the soil profile; and a soil similar to the St. Marys family, but with no development in the subsoil. Included areas make up approximately 20 percent of the map unit area.

106 - Basket - Bondranch families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 5,500 to 9,085 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Basket Family	Bondranch family	Rock outcrop, metasedimentary
Approx Proportion	20 percent	20 percent	20 percent
Landscape Position	Mountainsides	Mountainsides	Ridges and mountainsides
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemista tridentata</i>); Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Mormon Tea (<i>Ephedra</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral	0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium, & coarse subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	28 to 57 inches; pale brown and light yellowish brown; extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	5 to 16 inches; brown & yellowish brown gravelly loam; moderate medium subangular blocky structure; neutral	—
Substratum	57 inches; hard metasedimentary rock	16 inches; hard metamorphosed cambrian marine bedrock	—

Soil Properties

Restrictive Layer Depth	25 to 57 inches HB	12 to 20 inches HB	—
Effective Rooting Depth (inches)	40 to 57 inches	12 to 20 inches	—
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.2 to 2.7 inches)	—
Water Retention Class	2 (1.2 to 1.5 inches)	1 to 2 (1.2 to 2.7 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	0.6 to 2.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	—
Subsurface	0.10 (low)	0.28 (moderate)	—
T Value	4	1	—
Wind Erodability Group	8	8	—

106 - Basket - Bondranch families - Rock outcrop (continued)

Soil Manageability Group Class

IV
4EXgp

IV
4EXdgp

Range Interpretations

Productivity (lb/acre)	400 to 600	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 20% shallow soils; high erosion hazard; steep slopes; 20% rock outcrop	Plant competition; 20% shallow soils; high erosion hazard; steep slopes; 20% rock outcrop	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class			
Surface	GC	SC	—
Subsoil	GM; GW-GM	SC	—
Substratum	—	—	—
AASHTO Class			
Surface	A-2-4	A-4	—
Subsoil	A-2-6	A-4	—
Substratum	—	—	—
Suitability for			
Sand	Poor: Excess fines	Unsuited	—
Gravel	Poor: Excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of rubbleland, on mountainsides; the Bregar and Hartig families, 60 to 80 percent slopes, on mountainsides; the Finley and Mulett families, on toeslopes at lower elevations; and riverwash in canyon bottoms. Included areas make up approximately 40 percent of the map unit area.

107 - Basket - Bondranch families - Rock outcrop, metasedimentary association, 60 to 80 percent slopes

Elevation: 7,000 to 9,700 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Basket family	Bondranch family	Rock outcrop, metasedimentary
Approx Proportion	30 percent	20 percent	20 percent
Landscape Position	Northerly and easterly-facing mountainsides	Southerly and westerly-facing mountainsides	Ridges and upper mountainsides
Typical Vegetation	Singleleaf Pinyon Pine (pinus monophylla); Big Sagebrush (Artemisia tridentata); Antelope Bitterbrush (Purshia tridentata)	Singleleaf Pinyon Pine (Pinus monophylla); Mormon Tea (Ephedra spp.)	—

Soil Profile Description

Surface Layer	0 to 28 inches; pale brown very channery loam & fine sandy loam; weak very fine subangular blocky structure; neutral	0 to 5 inches; pale brown very gravelly sandy loam & loam; weak fine, medium & coarse subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	5 to 16 inches; brown & yellowish brown gravelly loam; moderate medium subangular blocky structure; neutral	—
Substratum	57 inches; hard metasedimentary bedrock	16 inches; hard metamorphosed cambrian marine bedrock	—

Soil Properties

Restrictive Layer Depth	25 to 57 inches HB	12 to 20 inches HB	—
Effective Rooting Depth (inches)	40 to 57 inches	12 to 20 inches	—
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.2 to 2.7 inches)	—
Water Retention Class	2 (1.2 to 1.5 inches)	1 to 2 (1.2 to 2.7 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	0.6 to 2.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Very rapid	Very rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	—
Subsurface	0.10 (low)	0.28 (moderate)	—
T Value	4	1	—
Wind Erodability Group	8	8	—

107 - Basket - Bondranch families - Rock outcrop (continued)

Soil Manageability			
Group	IV	IV	IV
Class	4EGXp	4EGXdp	—

Range Interpretations

Productivity (lb/acre)	400 to 600	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 20% shallow soils; 20% rock outcrop; high erosion hazard; very steep slopes	Plant competition; 20% shallow soils; 20% rock outcrop; high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class			
Surface	GC	SC	—
Subsoil	GM;GW-GM	SC	—
Substratum	—	—	—
AASHTO Class			
Surface	A-2-4	A-4	—
Subsoil	A-2-6	A-4	—
Substratum	—	—	—
Suitability for			
Sand	Poor: Excess fines	Unsuited	—
Gravel	Poor: Excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Basket and Bondranch families, 15 to 30 percent slopes, on mountainsides; the Mulett family, 30 to 60 percent slopes, on southerly and westerly-facing mountainsides, at lower elevations; and a soil similar to the Spaa family, but shallow to soft bedrock, on northerly and easterly-facing mountainsides. Included areas make up approximately 30 percent of the map unit area.

108 - Basket - Bregar families complex, 15 to 30 percent slopes

Elevation: 6,800 to 8,500 feet Annual Precipitation: 8 to 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Basket family

50 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

Bregar family

30 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big
Sagebrush (*Artemisia tridentata*); Antelope
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 28 inches; pale brown very channery
loam & fine sandy loam; weak very fine
subangular blocky structure; neutral

0 to 2 inches; light brownish gray very cobbly
loam; weak medium platy structure; mildly
alkaline

Subsoil

28 to 57 inches; pale brown and light
yellowish brown, extremely channery loam &
clay loam; moderate very fine angular blocky
structure; neutral

2 to 15 inches; light yellowish brown extremely
gravelly & extremely cobbly loam; massive;
neutral to mildly alkaline

Substratum

57 inches; hard metasedimentary bedrock

15 inches; hard fractured silty shale bedrock

Soil Properties

Restrictive Layer Depth

25 to 57 inches HB

15 to 20 inches FB

Effective Rooting
Depth (inches)

40 to 57 inches

15 to 20 inches

Available Water
Capacity

Very low to low (1.2 to 3.4 inches)

Very low (0.6 to 1.1 inches)

Water Retention Class

2 (1.2 to 1.5 inches)

3 (0.6 to 1.1 inches)

Hydrologic Soil Group

B

D

Permeability (in./hr.)

0.2 to 0.6

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate - High

Moderate - High

Erosion Factor (k)

Surface

0.05 (low)

0.10 (low)

Subsurface

0.10 (low)

0.05 (low)

T Value

4

1

Wind Erodability
Group

8

8

108 - Basket - Bregar families complex (continued)

Soil Manageability
Group
Class

II
2ep

II
3Ped

Range Interpretations

Productivity (lb/acre)

400 to 600

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 30% shallow soils; high erosion hazard

Plant competition; 30% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; small stones

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; large & small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - large & small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GC
GM; GW-GM
—

GC
GC; GW-GM
—

AASHTO Class
Surface
Subsoil
Substratum

A-2-4
A-2-6
—

A-2-4
A-2-4
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Poor: Excess fines
Poor: Excess fines
Poor: Slope; small stones
15-25% slopes:
Fair - Slope; area reclaim
25-30% slopes:
Poor - slope:

Unsuited
Unsuited
Poor: Slope; area reclaim; small stones
15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Hartig family; and a soil similar to the Bregar family, but shallow to soft bedrock. Included areas make up approximately 20 percent of the map unit area.

109 - Basket- Packham - Soakpak families association, 30 to 60 percent slopes

Elevation: 7,040 to 9,900 feet Annual Precipitation: 8 to 12 inches

Soil Map Unit Components	Basket family	Packham family	Soakpak family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Southerly and westerly facing mountainsides	Mid to lower northerly and easterly facing mountainsides	Upper northerly and easterly facing mountainsides
Slope	30 to 60 percent slopes	30 to 60 percent slopes	30 to 60 percent slopes
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Wheatgrass (<i>Agropyron</i> spp.)	Carex (<i>Carex</i> spp.); Low Phlox (<i>Phlox hoodii</i>); Pringle Blue grass (<i>Poa pringleii</i>)
Soil Profile Description			
Surface Layer	0 to 28 inches; pale brown very channery fine sandy loam & loam; weak very fine subangular blocky structure; neutral	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thick platy structure; neutral	0 to 9 inches; grayish brown & brown extremely cobbly & very gravelly sandy loam; moderate fine & medium, & weak very fine & fine subangular blocky structure; slightly to medium acid
Subsoil	28 to 57 inches; pale brown and light yellowish brown, extremely channery loam & clay loam; moderate very fine angular blocky structure; neutral	3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral	9 to 27 inches; pale brown very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid
Substratum	57 inches; hard metasedimentary bedrock	15 to 60+ inches; light yellowish brown & very pale brown gravelly & extremely gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline	27 to 42 inches; light gray very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid 42 inches; hard fractured granodiorite bedrock
Soil Properties			
Restrictive Layer Depth	25 to 57 inches HB	30 to 60 inches FB	30 to 60 + inches FB
Effective Rooting Depth (inches)	40 to 57 inches	20 to 50 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.2 to 3.4 inches)	Very low to low (1.3 to 3.3 inches)	Very low to moderate (1.7 to 4.2 inches)
Water Retention Class	2 (1.2 to 1.5 inches)	2 to 3 (1.0 to 1.2 inches)	2 (1.3 to 1.6 inches)
Hydrologic Soil Group	B	B	B
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	0.6 to 2.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	Rapid to Very Rapid
Max Erosion Hazard	High	Moderate to High	Moderate to High
Erosion Factor (k)			
Surface	0.05 (low)	0.05 (low)	0.17 (low)
Subsurface	0.10 (low)	0.05 (low)	0.10 (low)
T Value	4	3	4
Wind Erodability Group	8	8	8

109 - Basket- Packham - Soakpak families association (continued)

Soil Manageability Group Class	III 3Egpx	III 3Pegx	III 3Egpx
Range Interpretations			
Productivity (lb/acre)	400 to 600	500 to 700	75 to 100
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 10% rock outcrop; high erosion hazard; steep slopes	Plant competition; 10% rock outcrop; high erosion hazard; steep slopes	Plant competition; 10% rock outcrop; high erosion hazard; steep slopes
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope; small stones	Severe: Slope	Severe: Slope
Picnic Areas	Severe: Slope	Severe: Slope	Severe Slope
Paths & Trails	Severe: Slope	Severe: Slope; large stones	Severe: Slope
Engineering Interpretations			
Unified Class			
Surface	GC	GM; GW-GM	SM-SC
Subsoil	GM; GW-GM	GM; GW-GM	GW-GM; GM-GC
Substratum	—	GM; GW-GM	GW-GM; GM-GC
AASHTO Class			
Surface	A-2-4	A-1-a; A-1-b; A-2-4	A-4
Subsoil	A-2-6	A-2-6	A-2-4
Substratum	—	A-1-a; A-1-b; A-2-4	A-1-a; A-1-b; A-2-4
Suitability for			
Sand	Poor: Excess fines	Unsuited	Unsuited
Gravel	Poor: Excess fines	Poor: Excess fines	Poor: Excess fines
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones	Poor: Slope; small stones
Roadfill	Poor: Slope	Poor: Slope	Poor: Slope
Included Areas & Remarks			
Included in this map unit are small areas of granitic rock outcrop, on mountainsides and ridges; and a soil similar to the Soakpak family, but with a cryic temperature regime, on mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 20 percent of the map unit area.			

110 - Bearskin - Toeja families complex, 30 to 60 percent slopes

Elevation: 6,720 to 7,760 feet Annual Precipitation: 11 to 12 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Bearskin family

45 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

Toeja family

35 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Curleaf Mountain Mahogany (*Cercocarpus ledifolius*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

1 to 0 inch; Litter

1 to 0 inch; Litter

0 to 2 inches; brown very cobbly sandy loam;
weak very fine & fine subangular blocky
structure; neutral

0 to 12 inches; light brownish gray & grayish
brown very cobbly sandy loam & gravelly loam;
weak very coarse platy & weak medium
subangular blocky structure; moderately alkaline

Subsoil

2 to 17 inches; brown cobbly sandy clay loam
& sandy clay loam; moderate medium &
coarse, and strong coarse subangular blocky
structure; neutral

12 to 22 inches; yellowish brown gravelly sandy
clay loam; strong fine & medium subangular
blocky structure; moderately alkaline

Substratum

17 inches; hard basalt bedrock

22 inches; weathered rhyolite (paralithic contact)

Soil Properties

Restrictive Layer Depth

13 to 20 inches HB

21 to 24 inches PARA

Effective Rooting
Depth (inches)

13 to 20 inches

21 to 24 inches

Available Water
Capacity

Very low to low (1.6 to 3.2 inches)

Low (2.4 to 3.4 inches)

Water Retention Class

1 to 2 (1.6 to 3.2 inches)

1 to 2 (2.1 to 2.7 inches)

Hydrologic Soil Group

D

C

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Max Erosion Hazard

High

High to Very High

Erosion Factor (k)

Surface

0.02 (low)

0.10 (low)

Subsurface

0.10 (low)

0.28 (moderate)

T Value

1

2

Wind Erodability
Group

8

8

110 - Bearskin - Toeja families complex (continued)

Soil Manageability Group Class

III
3Edgpx

III
3Egx

Range Interpretations

Productivity (lb/acre)

400 to 600

600 to 1000

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils; 10%
rock outcrop; high erosion hazard; steep slopes

Plant competition; 45% shallow soils; 10% rock
outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope; large stones

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SC

SM

Subsoil

SM

SM

Substratum

—

—

AASHTO Class

Surface

A-2-4

A-4

Subsoil

A-6

A-2-7

Substratum

—

—

Suitability for

Sand

Poor: Excess fines

Poor: Excess fines

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Berent family, but colder, 15 to 30 percent slopes, in mountain valleys and canyons; and 10 percent basalt rock outcrop, on mountainsides and ridges. Included areas make up approximately 20 percent of the map unit area.

111 - Berent family, 5 to 15 percent slopes

Elevation: 6,700 to 7,800 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Berent family

80 percent

Stabalized sand dunes, superimposed on basalt flows

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline

Subsoil

—

Substratum

13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand, and gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Effective Rooting Depth (inches)

20 to 40 inches

Available Water Capacity

Low to moderate (3.8 to 5.0 inches)

Water Retention Class

2 to 3 (1.1 to 1.6 inches)

Hydrologic Soil Group

A

Permeability (in./hr.)

2.0 to 6.0

Drainage Class

Well drained

Runoff

Medium

Max Erosion Hazard

High

Erosion Factor (k)

Surface

0.15 (low)

Subsurface

0.10 (low)

T Value

4

Wind Erodability Group

2

111 - Berent family (continued)

Soil Manageability
Group
Class

III
3Ep

Range Interpretations

Productivity (lb/acre) 300 to 400
Suitability Summer - Autumn
Most Limiting Factors High erosion hazard

Recreation Interpretations - Limitations for

Camp Areas 5-8% slopes:
Moderate - Too sandy
8-15% slopes:
Moderate - slope; Too sandy
Picnic Areas Severe: Too sandy
Paths & Trails Moderate: Too sandy

Engineering Interpretations

Unified Class
Surface SM; SW-SM
Subsoil —
Substratum SM; SW-SM

AASHTO Class
Surface A-2-4
Subsoil —
Substratum A-2-4

Suitability for
Sand Poor: Excess fines
Gravel Unsuitied
Topsoil 5-8% slopes:
Fair - Too sandy
8-15% slopes:
Fair - slope; Too sandy
Roadfill Good

Included Areas & Remarks

Included in this map unit are small areas of the Abgese family, on toeslopes bordering the Berent family; the Berent family, 15 to 30 percent slopes, on steeper sand dunes; and a soil similar to the Berent family, but only 1 foot deep to the underlying Abgese and Toeja families, 15 to 30 percent slopes, on steep sand dunes. Included areas make up approximately 20 percent of the map unit area.

112 - Berent family - Rock outcrop, granitic complex, 5 to 30 percent slopes

Elevation: 6,150 to 6,800 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Berent family

55 percent

Basin fills

5 to 30 percent

Big Sagebrush (*Artemisia tridentata*);
Antelope Bitterbrush (*Purshia tridentata*)

Rock outcrop, granitic

20 percent

Protrusions throughout the unit

—

—

Soil Profile Description

Surface Layer

0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand, and gravelly sandy loam; massive; moderately alkaline

—

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

—

Effective Rooting
Depth (inches)

20 to 40 inches

—

Available Water
Capacity

Low to moderate (3.8 to 5.0 inches)

—

Water Retention Class

2 to 3 (1.1 to 1.6 inches)

—

Hydrologic Soil Group

A

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Medium to Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.15 (low)

—

Subsurface

0.10 (low)

—

T Value

4

—

Wind Erodability
Group

2

—

112 - Berent family - Rock outcrop (continued)

Soil Manageability		
Group	III	III
Class	3Ep	

Range Interpretations

Productivity (lb/acre)	300 to 400	—
Suitability	Summer - Autumn	—
Most Limiting Factors	20% rock outcrop; high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	5-8% slopes: — Moderate - Too sandy	
	8-15% slopes: — Moderate - slope; Too sandy	
Picnic Areas	Severe: Too sandy	—
Paths & Trails	Moderate: Too sandy	—

Engineering Interpretations

Unified Class		
Surface	SM; SW-SM	—
Subsoil	—	—
Substratum	SM; SW-SM	—
AASHTO Class		
Surface	A-2-4	—
Subsoil	—	—
Substratum	A-2-4	—
Suitability for		
Sand	Poor: Excess fines	—
Gravel	Unsuited	—
Topsoil	5-8% slopes: — Fair - Too sandy	
	8-15% slopes: — Fair - slope; Too sandy	
Roadfill	Good	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Yuko family, but with a clayey control section, 5 to 15 percent slopes, on gentle benches bordering steep mountainsides; a soil similar to the Hartig family, but less than 20 inches to soft bedrock, 15 to 30 percent slopes, under rock outcroppings; and the Wrango family, 5 to 15 percent slopes, in basin fills. Included areas make up approximately 25 percent of the map unit area.

113 - Beveridge family - Rock outcrop, limestone complex, 60 to 80 percent slopes

Elevation: 6,400 to 9,500 feet Annual Precipitation: 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Beveridge family

60 percent

Colluvial mountainsides

60 to 80 percent

Curleaf Mountain Mahogany (*Cercocarpus ledifolius*); Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Rock outcrop, Limestone

25 percent

Ridges & mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 2 inches; pale brown very gravelly loamy sand; single grained; violently effervescent; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

2 to 13 inches; brown extremely cobbly and extremely stony loam; weak very fine subangular blocky structure; violently effervescent; moderately alkaline

—

13 inches; hard fractured limestone bedrock

Soil Properties

Restrictive Layer Depth

10 to 20 inches FB

—

Effective Rooting Depth (inches)

10 to 20 inches

—

Available Water Capacity

Very low (0.3 to 0.9 inches)

—

Water Retention Class

3 (0.3 to 0.9 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.6 to 2.0

—

Drainage Class

Well drained

—

Runoff

Very Rapid

—

Max Erosion Hazard

Very High

—

Erosion Factor (k)

Surface

0.02 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

113 - Beveridge family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EGPXd

IV

Range Interpretations

Productivity (lb/acre)	600 to 1000	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 60% shallow soils; 35% rock outcrop; very high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; Too sandy	—
Picnic Areas	Severe: Slope; Too sandy	—
Paths & Trails	Severe: Slope; Too sandy	—

Engineering Interpretations

Unified Class		
Surface	GW	—
Subsoil	SM	—
Substratum	—	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	A-1-b; A-2-4	—
Substratum	—	—
Suitability for		
Sand	Poor: Thin layer	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of metasedimentary rock outcrop, on ridges and mountainsides; and a soil similar to the Beveridge family, but moister, on mountainsides. Included areas make up approximately 15 percent of the map unit area.

114 - Blackston family, 15 to 30 percent slopes

Elevation: 5,200 to 7,000 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion	75 percent
Landscape Position	Dissected alluvial fans
Slope	15 to 30 percent
Typical Vegetation	Spiny Menodora (<i>Mendora spinescens</i>); Nevada Ephedra (<i>Ephedra nevadensis</i>)

Blackston family

Soil Profile Description

Surface Layer	0 to 7 inches; very pale brown gravelly sandy loam; moderate very thin and thin platy, & weak very fine & fine subangular blocky structure; mildly alkaline
Subsoil	—
Substratum	7 to 60 inches; light gray and white gravelly loam & extremely gravelly sandy loam; weak very fine, fine & medium subangular blocky structure & massive; mildly alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches
Effective Rooting Depth (inches)	40 to 60 inches
Available Water Capacity	Low (2.3 to 3.0 inches)
Water Retention Class	2 (1.7 to 2.2 inches)
Hydrologic Soil Group	B
Permeability (in./hr.)	0.6 to 2.0
Drainage Class	Well drained
Runoff	Rapid
Max Erosion Hazard	High
Erosion Factor (k)	
Surface	0.10 (low)
Subsurface	0.10 (low)
T Value	1
Wind Erodability Group	8

114 - Blackston family (continued)

Soil Manageability
Group
Class

III
3E

Range Interpretations

Productivity (lb/acre)

300 - 400

Suitability

Summer - Autumn

Most Limiting Factors

High erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Picnic Areas

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; Small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class

Surface

SM-SC

Subsoil

—

Substratum

GW-GM;GM-GC

AASHTO Class

Surface

A-2-4

Subsoil

—

Substratum

A-2-4

Suitability for

Sand

Unsuited

Gravel

Unsuited

Topsoil

Poor: slope

Roadfill

15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Gol family, but warmer and shallow to a hard calcium layer, 9 to 15 percent slopes, on gentle fans; and the Sanpete and Mackey families, on dissected alluvial fans. Included areas make up approximately 25 percent of the map unit area.

115 - Bluewing - Trocken families association, 5 to 15 percent slopes

Elevation: 4,600 to 7,200 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Bluewing family

55 percent

Major stream valley bottoms

5 to 15 percent

Shadscale (*Atriplex confertifolia*); Boxthorn (*Lycium* spp.)

Trocken family

25 percent

Alluvial fans bordering stream valleys

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*); Green fire (*Mendora* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; pale brown very stony loamy fine sand; weak fine granular structure; moderately alkaline

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

—

—

Substratum

3 to 60 inches; pale brown very cobbly loamy fine sand; very fine single grained; moderately alkaline

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

24 to 60+ inches HB

Effective Rooting Depth (inches)

40 to 60 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.8 to 2.2 inches)

Very low to low (1.3 to 4.0 inches)

Water Retention Class

3 (0.7 to 0.9 inches)

2 to 3 (1.1 to 1.4 inches)

Hydrologic Soil Group

A

B

Permeability (in./hr.)

6.0 to 20.0

2.0 to 6.0

Drainage Class

Somewhat excessive

Well drained

Runoff

Medium

Medium

Max Erosion Hazard

Moderate

High

Erosion Factor (k)

Surface

0.05 (low)

0.10 (low)

Subsurface

0.05 (low)

0.05 (low)

T Value

4

3

Wind Erodability Group

2

8

115 - Bluewing - Trocken families association (continued)

Soil Manageability
Group
Class

II
2epx

II
3Epx

Range Interpretations

Productivity (lb/acre)

100 to 300

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Large stones

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Picnic Areas

Severe: Large stones

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Paths & Trails

Severe: Large stones

Moderate: Small stones

Engineering Interpretations

Unified Class

Surface

SM-SC

SM

Subsoil

—

—

Substratum

GW-GM

GW-GM; GM-GC

AASHTO Class

Surface

A-2-4

A-1-a; A-2-4

Subsoil

—

—

Substratum

A-1-b; A-2-4

A-1-a; A-1-b, A-2-4

Suitability for

Sand

Poor: Excess fines

Unsuited

Gravel

Fair: Excess fines; large stones

Poor: Excess fines

Topsoil

Poor: Large & small stones

Poor: Small stones

Roadfill

Fair: Large stones

Good

Included Areas & Remarks

Included in this soil map unit are small areas of the Trocken family, on sideslopes of alluvial fans; and Riverwash, in stream valleys. Included areas make up approximately 20 percent of the map unit area.

116 - Brad family - Rock outcrop, granitic complex, 15 to 30 percent slopes

Elevation: 7,600 to 9,900 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Brad family

45 percent

Mountainsides, ridges & benches

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Curlleaf Mountain Mahogany (*Cercocarpus ledifolius*)

Rock outcrop, granitic

40 percent

Throughout unit

—

—

Soil Profile Description

Surface Layer

0 to 3 inches; dark grayish brown very
gravelly sand; weak medium granular
structure; neutral

Rock outcrop consists of contiguous bare bedrock
and less than 15 percent inclusions of soil
material capable of supporting plants

Subsoil

—

—

Substratum

3 to 6 inches; dark grayish brown very
gravelly loamy sand; massive; neutral

6 inches; hard adamellite bedrock

Soil Properties

Restrictive Layer Depth

4 to 8 inches HB

—

Effective Rooting
Depth (inches)

4 to 8 inches

—

Available Water
Capacity

Very low (0.1 to 0.3 inches)

—

Water Retention Class

3 (0.1 to 0.3 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

6.0 to 20.0

—

Drainage Class

Excessive

—

Runoff

Rapid

—

Max Erosion Hazard

High to Very High

—

Erosion Factor (k)

Surface

0.02 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability
Group

8

—

116 - Brad family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV 4DEPX	IV —
-------------	---------

Range Interpretations

Productivity (lb/acre)	600 to 1000	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 45% shallow soils; 40% rock outcrop; very high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope; small stones; depth to rock	—
Picnic Areas	Severe: Slope; large & small stones; too sandy	—
Paths & Trails	15-25% slopes: Severe - Large & small stones; 25-30% slopes: Severe - slope; large & small stones	—

Engineering Interpretations

Unified Class		
Surface	GW-GM	—
Subsoil	—	—
Substratum	GW-GM	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Poor: Thin layer	—
Topsoil	Poor: Slope; area reclaim; thin layer; small stones	—
Roadfill	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Sumine family, on mountainsides; a soil similar to the Hartig family, but with a sandy-skeletal control section, on mountainsides; and a soil similar to the Wrango family, but cooler, 2 to 5 percent slopes, in drainages. Included areas make up approximately 15 percent of the map unit area.

117 - Bregar - Slinger families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 6,100 to 10,480 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Bregar family	Slinger family	Rock outcrop, metasedimentary
Approx Proportion	40 percent	20 percent	15 percent
Landscape Position	Mountainsides	Mountainsides	Mountainsides and ridges
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 2 inches; light brownish gray very cobbly loam; weak medium platy structure; mildly alkaline	1 to 0 inch; Litter 0 to 14 inches; pale brown very gravelly sandy loam; weak fine granular structure & massive; slightly to strongly effervescent; mildly alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	2 to 15 inches; light yellowish brown extremely gravelly & extremely cobbly loam; massive; neutral to mildly alkaline	—	—
Substratum	15 inches; hard fractured silty shale bedrock	14 to 60 inches; light gray, very pale brown very gravelly sandy loam; massive; violently effervescent; moderately alkaline	—

Soil Properties

Restrictive Layer Depth	15 to 20 inches FB	35 to 60+ inches FB	—
Effective Rooting Depth (inches)	15 to 20 inches	35 to 60 inches	—
Available Water Capacity	Very low (0.6 to 1.1 inches)	Very low to low (1.7 to 3.5 inches)	—
Water Retention Class	3 (0.6 to 1.1 inches)	2 (1.2 to 1.4 inches)	—
Hydrologic Soil Group	D	B	—
Permeability (in./hr.)	0.6 to 2.0	2.0 to 6.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	—
Max Erosion Hazard	High	Moderate to High	—
Erosion Factor (k)			
Surface	0.10 (low)	0.10 (low)	—
Subsurface	0.05 (low)	0.10 (low)	—
T Value	1	4	—
Wind Erodability Group	8	8	—

117 - Bregar - Slinger families - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EPXdg

IV
3Xegp

IV
—

Range Interpretations

Productivity (lb/acre)

300 to 500

500 to 700

—

Suitability

Summer - Autumn

Summer - Autumn

—

Most Limiting Factors

Plant competition; 40% shallow
soils; 25% rock outcrop; high
erosion hazard; steep slopes

Plant competition; 40%
shallow soils; 25% rock
outcrop; high erosion hazard;
steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: slope

Severe: slope

—

Picnic Areas

Severe: slope

Severe: slope

—

Paths & Trails

Severe: slope

Severe: slope

—

Engineering Interpretations

Unified Class

Surface

GC

SM; SW-SM

—

Subsoil

GC; GW-GM

—

—

Substratum

—

GM; GW-GM

—

AASHTO Class

Surface

A-2-4

A-1-a; A-1-b; A-2-4

—

Subsoil

A-2-4

—

—

Substratum

—

A-1-a; A-1-b; A-2-4

—

Suitability for

Sand

Unsuited

Unsuited

—

Gravel

Unsuited

Poor: Excess fines

—

Topsoil

Poor: Slope; area reclaim; small
stones

Poor: Slope; small stones

—

Roadfill

Poor: Slope; area reclaim

Poor: Slope

—

Included Areas & Remarks

Included in this map unit are small areas of the Bregar and Slinger families, 60 to 80 percent percent slopes, on mountainsides and ridges; limestone rock outcrop and rubbleland, on mountainsides and ridges; and a soil similar to the Beveridge family, but moister, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

118 - Cinder cones

Elevation:

Annual Precipitation:

Soil Map Unit
Components

—

Approx Proportion

—

Landscape Position

—

Slope

—

Typical Vegetation

—

Soil Profile Description

Surface Layer

Cinder cones consist of areas of detached volcanic cinders which have accumulated around volcanic vents. These areas support little or no vegetation

Subsoil

—

Substratum

—

Soil Properties

Restrictive Layer Depth

—

Effective Rooting
Depth (inches)

—

Available Water
Capacity

—

Water Retention Class

—

Hydrologic Soil Group

—

Permeability (in./hr.)

—

Drainage Class

—

Runoff

—

Max Erosion Hazard

—

Erosion Factor (k)

Surface

—

Subsurface

—

T Value

—

Wind Erodability
Group

—

118 - Cinder cones (continued)

Soil Manageability
Group
Class

Range Interpretations

Productivity (lb/acre)	Suitability	Most Limiting Factors
1000	100%	100%
900	90%	90%
800	80%	80%
700	70%	70%
600	60%	60%
500	50%	50%
400	40%	40%
300	30%	30%
200	20%	20%
100	10%	10%
0	0%	0%

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

AASHTO Class
Surface
Subsoil
Substratum

Suitability for
Sand
Gravel
Topsoil
Roadfill

Included Areas & Remarks	
1	1.0000
2	2.0000
3	3.0000
4	4.0000
5	5.0000
6	6.0000
7	7.0000
8	8.0000
9	9.0000
10	10.0000
11	11.0000
12	12.0000
13	13.0000
14	14.0000
15	15.0000
16	16.0000
17	17.0000
18	18.0000
19	19.0000
20	20.0000
21	21.0000
22	22.0000
23	23.0000
24	24.0000
25	25.0000
26	26.0000
27	27.0000
28	28.0000
29	29.0000
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66	66.0000
67	67.0000
68	68.0000
69	69.0000
70	70.0000
71	71.0000
72	72.0000
73	73.0000
74	74.0000
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76	76.0000
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82	82.0000
83	83.0000
84	84.0000
85	85.0000
86	86.0000
87	87.0000
88	88.0000
89	89.0000
90	90.0000
91	91.0000
92	92.0000
93	93.0000
94	94.0000
95	95.0000
96	96.0000
97	97.0000
98	98.0000
99	99.0000
100	100.0000

119 - Credo family, 15 to 30 percent slopes

Elevation: 7,960 to 8,600 feet Annual Precipitation: 12 inches

Soil Map Unit Components

Approx Proportion	85 percent
Landscape Position	Mountainsides
Slope	15 to 30 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.); Juniper(<i>Juniperus</i> spp.)

Soil Profile Description

Surface Layer	0 to 2 inches; light brownish gray very gravelly coarse sand; weak fine granular structure; slightly acid
Subsoil	2 to 28 inches; light brownish gray, pale brown sandy loam & gravelly sandy clay loam; moderate fine, medium & coarse subangular blocky structure; slightly to medium acid
Substratum	28 to 37 inches; pale brown sandy loam; massive; medium acid 37 inches; highly weathered pyroclastic material (paralithic contact)

Soil Properties

Restrictive Layer Depth	37 to 60+ inches PARA
Effective Rooting Depth (inches)	20 to 40 inches
Available Water Capacity	Low to moderate (3.6 to 7.6 inches)
Water Retention Class	1 to 2 (1.9 to 2.5 inches)
Hydrologic Soil Group	C
Permeability (in./hr.)	0.2 to 0.6
Drainage Class	Well drained
Runoff	Rapid
Max Erosion Hazard	Moderate to High
Erosion Factor (k)	
Surface	0.05 (low)
Subsurface	0.15 (low)
T Value	2
Wind Erodability Group	8

119 - Credo family (continued)

Soil Manageability
Group
Class

II
2epx

Range Interpretations

Productivity (lb/acre)

300 to 500

Suitability

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop

Recreation Interpretations - Limitations for

Camp Areas

Severe: slope

Picnic Areas

Severe: slope

Paths & Trails

15-25% slopes:
Moderate - slope; Too sandy
25-30% slopes:
Severe slope

Engineering Interpretations

Unified Class

Surface

SM-SC

Subsoil

CL

Substratum

CL

AASHTO Class

Surface

A-2-4, A-4

Subsoil

A-6

Substratum

A-6

Suitability for

Sand

Unsuited

Gravel

Unsuited

Topsoil

Poor: Slope

Roadfill

15-25% slopes:
Poor - low strength
25-30% slopes:
Poor - slope; low strength

Included Areas & Remarks

Include in this map unit are small areas of basalt rock outcrop, on ridges and mountainsides; and the Spaa family, on ridgetops and upper mountainsides. Included areas make up approximately 15 percent of the map unit area.

120 - Credo - Basket families complex, 30 to 60 percent slopes

Elevation: 7,200 to 8,320 feet Annual Precipitation: 8 to 12 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Credo family

50 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Rabbitbrush (*Chrysothamnus* spp.); Juniper
(*Juniperus* spp.)

Basket family

25 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big
Sagebrush (*Artemisia tridentata*); Antelope
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 2 inches; light brownish gray very
gravelly coarse sand; weak fine granular
structure; slightly acid

0 to 28 inches; pale brown very channery fine
sandy loam & loam; weak very fine subangular
blocky structure; neutral

Subsoil

2 to 28 inches; light brownish gray, pale
brown sandy loam & gravelly sandy clay
loam; moderate fine, medium & coarse
subangular blocky structure; slightly to
medium acid

28 to 57 inches; pale brown and light yellowish
brown extremely channery clay loam; moderate
very fine angular structure; neutral

Substratum

28 to 37 inches; pale brown sandy loam;
massive; medium acid

57 inches; hard metasedimentary bedrock

37 inches; highly weathered pyroclastic
materials (paralithic contact)

Soil Properties

Restrictive Layer Depth

37 to 60+ inches PARA

25 to 57 inches HB

Effective Rooting
Depth (inches)

20 to 40 inches

40 to 57 inches

Available Water
Capacity

low to moderate (3.6 to 7.6 inches)

Very low to low (1.2 to 3.4 inches)

Water Retention Class

1 to 2 (1.9 to 2.5 inches)

2 (1.2 to 1.5 inches)

Hydrologic Soil Group

C

B

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid - very rapid

Rapid - very rapid

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.05 (low)

0.05 (low)

Subsurface

0.15 (low)

0.10 (low)

T Value

2

4

Wind Erodability
Group

8

8

120 - Credo - Basket families complex (continued)

Soil Manageability
Group
Class

III
3 Egpx

III
3 Egpx

Range Interpretations

Productivity (lb/acre)

300 to 500

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: slope: small stones

Picnic Areas

Severe: Slope

Severe: slope

Paths & Trails

Severe: Slope

Severe: slope

Engineering Interpretations

Unified Class

Surface

SM-SC

GC

Subsoil

CL

GM; GW-GM

Substratum

CL

—

AASHTO Class

Surface

A-2-4; A-4

A-2-4

Subsoil

A-6

A-2-6

Substratum

A-6

—

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope

Poor: Slope; small stones

Roadfill

Poor: Slope; low strength

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Typic Xerorthents soils, but cooler and finer textured, 9 to 30 percent slopes, in depressions; basalt rock outcrop, on ridges and escarpments; and a soil similar to the Hartig family, but with less than 35 percent rock fragments in the profile, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

121 - Finley family, 15 to 30 percent slopes

Elevation: 5,600 to 7,100 feet Annual Precipitation: 9 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Finley family

75 percent

Mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 7 inches; light brownish gray gravelly
fine sandy loam; weak fine granular structure;
mildly alkaline

Subsoil

7 to 18 inches; pale brown very gravelly
loam; moderate fine subangular blocky
structure; mildly alkaline

Substratum

18 to 29 inches; pale brown very gravelly
sandy loam; massive; moderately alkaline

29 inches; hard metasedimentary bedrock

Soil Properties

Restrictive Layer Depth

25 to 35 inches HB

Effective Rooting
Depth (inches)

25 to 35 inches

Available Water
Capacity

very low to low (1.7 to 3.0 inches)

Water Retention Class

2 (1.5 to 1.8 inches)

Hydrologic Soil Group

C

Permeability (in./hr.)

0.6 to 2.0

Drainage Class

Well drained

Runoff

Rapid

Max Erosion Hazard

High

Erosion Factor (k)

Surface

0.15 (low)

Subsurface

0.10 (low)

T Value

2

Wind Erodability
Group

8

121 - Finley family (continued)

Soil Manageability
Group
Class

III
3Epx

Range Interpretations

Productivity (lb/acre)

300 to 500

Suitability

Summer - Autumn

Most Limiting Factors

Plant competition; 5 percent rock outcrop;
high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Picnic Areas

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class

Surface

SM-SC

Subsoil

GM-GC

Substratum

SW-SM; SM-SC

AASHTO Class

Surface

A-2-4; A-4

Subsoil

A-1-b; A-2-4

Substratum

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Gravel

Unsuited

Topsoil

Poor: Slope; small stones

Roadfill

15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Washoe family, but drier, 9 to 15 percent slopes, on toeslopes; a soil similar to the Bondbranch family, but warmer, on ridgetops; and basalt rock outcrop, on ridges and mountainsides. Included areas make up approximately 25 percent of the map unit area.

122 - Finley - Moano - Mulett families complex, 5 to 40 percent slopes

Elevation: 6,800 to 8,800 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Finley family	Moano family	Mulett family
Approx Proportion	30 percent	20 percent	20 percent
Landscape Position	Mid to lower mountainsides	Ridgetops and upper mountainsides	Sideslopes of ridgetops
Slope	15 to 40 percent	5 to 15 percent	30 to 40 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Singleleaf Pinyon Pine (<i>Pinus monophylla</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)
Soil Profile Description			
Surface Layer	0 to 7 inches; light brownish gray gravelly fine sandy loam; weak fine granular structure; mildly alkaline	0 to 3 inches; light yellowish brown loam; weak fine granular structure; moderately alkaline	0 to 6 inches; pale brown sandy loam & very gravelly sandy clay loam; weak fine granular structure; mildly alkaline
Subsoil	7 to 18 inches; pale brown very gravelly loam; moderate fine subangular blocky structure; mildly alkaline	—	6 to 13 inches; light yellowish brown very gravelly clay loam; moderate medium subangular blocky structure; mildly alkaline
Substratum	18 to 29 inches; pale brown very gravelly sandy loam; massive; moderately alkaline 29 inches; hard metasedimentary bedrock	3 to 12 inches; brownish yellow very cobbly clay loam; massive; moderately alkaline 12 inches; hard quartzitic sandstone bedrock	— 13 inches; hard noncalcareous sedimentary bedrock
Soil Properties			
Restrictive Layer Depth	25 to 35 inches HB	12 to 14 inches HB	10 to 20 inches HB
Effective Rooting Depth (inches)	25 to 35 inches	12 to 14 inches	10 to 20 inches
Available Water Capacity	Very low to low (1.7 to 3.0 inches)	Very low (1.3 to 2.0 inches)	Very low to low (1.0 to 2.5 inches)
Water Retention Class	2 (1.5 to 1.8 inches)	2 (1.3 to 2.0 inches)	1 to 3 (1.0 to 2.5 inches)
Hydrologic Soil Group	C	D	D
Permeability (in./hr.)	0.6 to 2.0	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid	Medium	Rapid
Max Erosion Hazard	High to very high	Moderate	Moderate to High
Erosion Factor (k)			
Surface	0.15 (low)	0.15 (low)	0.15 (low)
Subsurface	0.10 (low)	0.15 (low)	0.10 (low)
T Value	2	1	1
Wind Erodability Group	8	8	3

122 - Finley - Moano - Mulett families complex (continued)

Soil Manageability Group Class	III 3Epx	III 2edpx	III 3Edgpx
Range Interpretations			
Productivity (lb/acre)	300 to 500	300 to 500	300 to 500
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard	Plant competition; 40% shallow soils; 10% rock outcrop; high erosion hazard
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope	5-8% slopes: Moderate - Percs slowly 8-15% slopes: Moderate - slope; percs slowly	Severe: Slope
Picnic Areas	Severe: Slope	5-8% slopes: slight 8-15% slope: Moderate - slope	Severe: Slope
Paths & Trails	15-25% slopes: Moderate - small stones 25-40% slopes: Severe - slope	Slight	Severe: Slope
Engineering Interpretations			
Unified Class	SM-SC	CL	SM-SC
Surface	GM-GC	—	SC
Subsoil	SW-SM; SM-SC	SC	—
Substratum			
AASHTO Class			
Surface	A-2-4; A-4	A-4	A-2-4
Subsoil	A-1-b; A-2-4	—	A-2-6
Substratum	A-1-a; A-1-b; A-2-4	A-6	—
Suitability for			
Sand	Unsuited	Unsuited	Unsuited
Gravel	Unsuited	Unsuited	Unsuited
Topsoil	Poor: Slope; small stones	5-8% slopes: Poor - small stones; area reclaim 8-15% slopes: Poor - slope; small stones; area reclaim	Poor: Slope; small stones; area reclaim
Roadfill	15-25% slopes: Poor - area reclaim 25-40% slopes: Poor - slope; area reclaim	Poor: Area reclaim	Poor: Slope; Area reclaim
Included Areas & Remarks			
Included in this map unit are small areas of the Checkett family, 30 to 40 percent slopes, on sideslopes of ridges; sedimentary rock outcrop, on ridges and mountainsides; the Washoe family, 15 to 30 percent slopes, on mid to lower mountainsides; and the Wrango family, 15 to 40 percent slopes, on mid to lower mountainsides. Included areas make up approximately 30 percent of the map unit area.			

123 - Gol family - Durargidic Argixerolls complex, 2 to 15 percent slopes

Elevation: 8,400 to 10,300 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Gol family

35 percent

Sideslopes of low ridges of alluvial fans

4 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Morman Tea (*Ephedra* spp.)

Durargidic Argixerolls

30 percent

Alluvial fans

2 to 15 percent

Black Sagebrush (*Artemisia arbuscula nova*);
Cotton thorn (*Leptadymia axillaris*)

Soil Profile Description

Surface Layer

0 to 4 inches; brown gravelly loamy sand;
weak medium granular structure; neutral

0 to 4 inches; brown loamy sand; weak medium
granular structure; neutral

Subsoil

4 to 14 inches; yellowish brown gravelly &
very gravelly sandy loam; weak medium
subangular blocky structure; mildly alkaline

4 to 25 inches; brown, pale brown gravelly sandy
loam; weak & moderate medium subangular
blocky structure; neutral

Substratum

14 inches; weathered adamellite (paralithic
contact)

25-45 inches; pale brown, yellowish brown
gravelly sandy loam; massive; mildly alkaline

45 inches; highly weathered adamellite (paralithic
contact)

Soil Properties

Restrictive Layer Depth

9 to 14 inches PARA

45 to 60 inches PARA

Effective Rooting
Depth (inches)

9 to 14 inches

40 to 60 inches

Available Water
Capacity

Very low (0.6 to 1.1 inches)

Low to moderate (3.4 to 5.7 inches)

Water Retention Class

3 (0.6 to 1.1 inches)

2 (1.4 to 1.8 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Slow to medium

Slow to medium

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.05 (low)

0.15 (low)

Subsurface

0.10 (low)

0.20 (moderate)

T Value

1

3

Wind Erodability
Group

2

2

123 - Gol family - Durargidic Argixerolls complex (continued)

Soil Manageability Group Class

IV
4EPdx

IV
3Epx

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 700

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 35% shallow soils; high erosion hazard

Plant competition; 35% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

4-8% slopes:
Moderate - Too sandy; small stones
8-15% slopes:
Moderate - slope; too sandy; small stones

2-8% slopes:
Moderate - too sandy
8-15% slopes:
Moderate - slope; too sandy

Picnic Areas

4-8% slopes:
Moderate - Too sandy; small stones
8-15% slopes:
Moderate - slope; too sandy; small stones

2-8% slopes:
Moderate - too sandy
8-15% slopes:
Moderate - slope; too sandy

Paths & Trails

Moderate: Too sandy; small stones

Moderate: Too sandy

Engineering Interpretations

Unified Class

Surface

SM; SW-SM

SC

Subsoil

SW-SM; SM-SC

SM-SC

Substratum

—

SM

AASHTO Class

Surface

A-1-b; A-2-4

A-2-4

Subsoil

A-2-4

A-1-b; A-2-4

Substratum

—

A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones; area reclaim

Poor: Small stones

Roadfill

Poor: Area reclaim

Fair: Area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Typic Haplargids soils, on alluvial fans; a soil similar to the Durargidic Argixerolls soils, but with finer textures, on old alluvial fans; a soil similar to the Typic Xerorthents soils, but less than 20 inches to soft bedrock, 4 to 15 percent slopes, on sideslopes of low ridges of alluvial fans; and granitic rock outcrop, throughout the map unit. Included areas make up approximately 35 percent of the map unit area.

124 - Hartig - Dunul families - Rock outcrop, granitic association, 50 to 70 percent slopes

Elevation: 5,800 to 10,400 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Hartig family	Dunul family	Rock outcrop, granitic
Approx Proportion	35 percent	30 percent	15 percent
Landscape Position	Northerly & easterly-facing mountainsides	Southerly & westerly-facing mountainsides	Mountainsides & ridges
Slope	50 to 70 percent	50 to 70 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Common Pricklygillia (<i>Leptodactylon pungens</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	1 to 0 inch; Litter 0 to 3 inches; pale brown very gravelly loamy sand; weak very fine granular structure; slightly acid	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—	—
Substratum	11 to 33 inches; brown extreme stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock	3 to 60 inches; pale brown & very pale brown very gravelly loamy sand, medium sand & gravelly medium sand; massive; neutral to moderately alkaline	—

Soil Properties

Restrictive Layer Depth	24 to 60 inches FB	Greater than 60 inches	—
Effective Rooting Depth (inches)	20 to 40 inches	40 to 60 inches	—
Available Water Capacity	Very low to moderate (1.5 to 4.8 inches)	Low (2.0 to 3.0 inches)	—
Water Retention Class	2 (1.5 to 2.0 inches)	3 (0.6 to 0.9 inches)	—
Hydrologic Soil Group	B	A	—
Permeability (in./hr.)	0.6 to 2.0	6.0 to 20.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Very Rapid	Very Rapid	—
Max Erosion Hazard	High	High-Very High	—
Erosion Factor (k)			
Surface	0.24 (moderate)	0.05 (low)	—
Subsurface	0.17 (low)	0.05 (low)	—
T Value	3	2	—
Wind Erodability Group	8	8	—

124 - Hartig - Dunul families - Rock outcrop (continued)

Soil Manageability Group Class	IV 4EGpx	IV 4EGPx	IV —
Range Interpretations			
Productivity (lb/acre)	300 to 400	300 to 500	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 15% rock outcrop; high erosion hazard; very steep slopes	Plant competition; 15% rock outcrop; high erosion hazard; very steep slopes	—
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—
Engineering Interpretations			
Unified Class			
Surface	SM	SW-SM	—
Subsoil	—	—	—
Substratum	GM	SW	—
AASHTO Class			
Surface	A-4	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—	—
Substratum	A-1-a; A-1-b; A-2-4	A-1-a; A-1-b; A-2-4	—
Suitability for			
Sand	Unsuited	Good	—
Gravel	Poor: Slope; thin layer; excess fines	Unsuited	—
Topsoil	Poor: Slope; small stones	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	Poor: Slope	—

Included Areas & Remarks

Included in this map unit are small areas of the Packham family, on northerly and easterly-facing mountainsides; the Soakpak family, on upper mountainsides at higher elevations; a soil similar to the Soakpak family, but warmer, on upper mountainsides at higher elevations; and the Slinger family, on southerly and westerly-facing mountainsides. Included areas make up approximately 20 percent of the map unit area.

125 - Hartig family - Rock outcrop, granitic complex, 30 to 60 percent slopes

Elevation: 7,600 to 10,160 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Hartig family	Rock outcrop, granitic
Approx Proportion	45 percent	30 percent
Landscape Position	Mountainsides	Ridgetop, sideslopes, & protrusions in floodplains
Slope	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Common Pricklygilia (<i>Leptodactylon pungens</i>)	—
Soil Profile Description		
Surface Layer	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	11 to 33 inches; brown extremely stoney fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock	
Soil Properties		
Restrictive Layer Depth	24 to 60 inches FB	—
Effective Rooting Depth (inches)	20 to 40 inches	—
Available Water Capacity	Very low to moderate (1.5 to 4.8 inches)	—
Water Retention Class	2 (1.5 to 2.0 inches)	—
Hydrologic Soil Group	B	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.17 (low)	—
T Value	3	—
Wind Erodability Group	8	—

125 - Hartig family - Rock outcrop (continued)

Soil Manageability		
Group	III	—
Class	3Xegp	—

Range Interpretations

Productivity (lb/acre)	300 to 400	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 30% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	SM	—
Subsoil	—	—
Substratum	GM	—
AASHTO Class		
Surface	A-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Poor: Slope; thin layer; excess fines	—
Topsoil	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Wenzel family, 15 to 30 percent slopes, on benches of mountainsides; the Hartig family, 15 to 30 percent slopes, on mountainsides; and a soil similar to the St. Marys family, but warmer, and with a thick dark surface layer, 2 to 15 percent slopes, on floodplains. Included areas make up approximately 25 percent of the map unit area.

126 - Hartig - Packham families association, 30 to 60 percent slopes

Elevation: 8,300 to 11,500 feet Annual Precipitation: 9 to 11 inches

Soil Map Unit Components	Hartig family	Packham family
	45 percent	40 percent
	Mid to lower mountainsides	Upper mountainsides
	30 to 60 percent	50 to 60 percent
	Big Sagebrush (<i>Artemisia tridentata</i>); Pricklygilia (<i>Leptodactylon pungens</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Arizona Wheatgrass (<i>Agropyron</i> spp.)
Soil Profile Description		
Surface Layer	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thick platy structure; neutral
Subsoil	—	3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral
Substratum	11 to 33 inches; brown extremely stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock	15 to 60+ inches; light yellowish brown & very pale brown extremely gravelly & gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline
Soil Properties		
Restrictive Layer Depth	24 to 60 inches FB	30 to 60 inches FB
Effective Rooting Depth (inches)	20 to 40 inches	20 to 50 inches
Available Water Capacity	Very low to moderate (1.5 to 4.8 inches)	Very low to low (1.3 to 3.3 inches)
Water Retention Class	2 (1.5 to 2.0 inches)	2 to 3 (1.0 to 1.2 inches)
Hydrologic Soil Group	B	B
Permeability (in./hr.)	0.6 to 2.0	0.2 to 0.6
Drainage Class	Well drained	Well drained
Runoff	Rapid to very rapid	Very Rapid
Max Erosion Hazard	Moderate to High	Moderate to High
Erosion Factor (k)		
Surface	0.24 (moderate)	0.05 (low)
Subsurface	0.17 (low)	0.05 (low)
T Value	3	3
Wind Erodability Group	8	8

126 - Hartig - Packham families association (continued)

Soil Manageability Group Class

III
2egp

III
3Peg

Range Interpretations

Productivity (lb/acre)

300 to 400

500 to 700

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard; steep slopes

Plant competition; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope; large stones

Engineering Interpretations

Unified Class

Surface

SM

GM; GW-GM

Subsoil

—

GM; GW-GM

Substratum

GM

GM; GW-GM

AASHTO Class

Surface

A-4

A-1-a; A-1-b; A-2-4

Subsoil

—

A-2-6

Substratum

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Poor: Slope; thin layer; excess fines

Poor: Excess fines

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Bondbranch family, but with carbonatic mineralogy, 60 to 80 percent slopes, on upper mountainsides; and a soil similar to the St. Marys family, but warmer, and with a thick dark surface layer, 2 to 15 percent slopes, on floodplains. Included areas make up approximately 15 percent of the map unit area.

127 - Hymas family - Rock outcrop, limestone association, 15 to 30 percent slopes

Elevation: 8,600 to 11,000 feet Annual Precipitation: 10 inches

Soil Map Unit Components	Hymas family	Rock outcrop, limestone
Approx Proportion	40 percent	30 percent
Landscape Position	Mountainsides, ridgetops	Convex slopes, ridgetops
Slope	15 to 30 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Juniper (<i>Juniperus</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 6 inches; brown gravelly sandy loam; weak fine granular structure; slightly to strongly effervescent; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	6 to 19 inches; yellowish brown very gravelly sandy loam; moderately fine subangular blocky structure; violently effervescent; moderately alkaline	—
	19 inches; hard fractured dolomite bedrock	

Soil Properties

Restrictive Layer Depth	4 to 20 inches FB	—
Effective Rooting Depth (inches)	4 to 20 inches	—
Available Water Capacity	Very low (0.3 to 1.7 inches)	—
Water Retention Class	2 to 3 (0.3 to 1.7 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	2.0 to 6.0	—
Drainage Class	Well drained	—
Runoff	Rapid	—
Max Erosion Hazard	Moderate	—
Erosion Factor (k)		
Surface	0.10 (low)	—
Subsurface	0.10 (low)	—
T Value	1	—
Wind Erodability Group	8	—

127 - Hymas family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4DEPX

IV
—

Range Interpretations

Productivity (lb/acre)

400 to 600

—

Suitability

Summer - Autumn

—

Most Limiting Factors

Plant competition; 40% shallow soils; 30%
rock outcrop

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Picnic Areas

Severe: Slope

—

Paths & Trails

15-25% slopes:

—

Moderate - slope; small stones

25-30% slopes:

Severe - slope

Engineering Interpretations

Unified Class

Surface

SM-SC

—

Subsoil

—

—

Substratum

SW-SM; SM-SC

—

AASHTO Class

Surface

A-1-b; A-2-4

—

Subsoil

—

—

Substratum

A-1-a; A-1-b; A-2-4

—

Suitability for

Sand

Poor: Excess fines; thin layer

—

Gravel

Unsuited

—

Topsoil

Poor: Slope; small stones; area reclaim

—

Roadfill

15-25% slopes:

—

Poor - area reclaim

25-30% slopes:

Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Hymas family, 30 to 60 percent slopes, on mountainsides; a soil similar to the St. Marys family, but with carbonatic mineralogy, 9 to 15 percent slopes, on lower mountainsides and toeslopes; a soil similar to the Beveridge family, but moister, 30 to 60 percent slopes, on steep southerly and westerly-facing mountainsides; and the Bartine family, 30 to 60 percent slopes, on steep mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 30 percent of the map unit area.

128 - Hymas family - Rock outcrop, limestone association, 30 to 60 percent slopes

Elevation: 6,400 to 10,900 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Hymas family

40 percent

Mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Juniper (*Juniperus* spp.)

Rock outcrop, limestone

35 percent

Convex slopes, ridgetops

30 to 60 percent

—

Soil Profile Description

Surface Layer

0 to 6 inches; brown gravelly sandy loam;
weak fine granular structure; slightly to
strongly effervescent; moderately alkaline

Rock outcrop consists of contiguous bare bedrock
and less than 15 percent inclusions of soil
material capable of supporting plants

Subsoil

—

—

Substratum

6 to 19 inches; yellowish brown very gravelly
sandy loam; moderately fine subangular
blocky structure; violently effervescent;
moderately alkaline

—

19 inches; hard fractured dolomite bedrock

Soil Properties

Restrictive Layer Depth

4 to 20 inches FB

—

Effective Rooting
Depth (inches)

4 to 20 inches

—

Available Water
Capacity

Very low (0.3 to 1.7 inches)

—

Water Retention Class

2 to 3 (0.3 to 1.7 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid to very rapid

—

Max Erosion Hazard

Moderate to High

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.10 (low)

—

T Value

1

—

Wind Erodability
Group

8

—

128 - Hymas family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV 4DEPXg	IV —
--------------	---------

Range Interpretations

Productivity (lb/acre)	400 to 600	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 40% shallow soils; 35% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	SM-SC	—
Subsoil	—	—
Substratum	SW-SM; SM-SC	—
AASHTO Class		
Surface	A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-a; A-1-b; A-2-4	—
Suitability for		
Sand	Poor: Excess fines; thin layer	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the St. Marys family, but with carbonatic mineralogy, on mountainsides; the Hymas family, 15 to 30 percent slopes, on ridges; a soil similar to the Beveridge family, but moister, 60 to 80 percent slopes, on steep southerly and westerly-facing mountainsides; and the Bartine family, 60 to 80 percent slopes, on steep mid to upper northerly and easterly-facing mountainsides. Included areas make up approximately 25 percent of the map unit area.

129 - Lithic Camborthids - Rock outcrop, sedimentary association, 2 to 15 percent slopes

Elevation: 5,500 to 6,100 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion	Lithic Camborthids 50 percent	Rock outcrop, sedimentary 20 percent
Landscape Position	Mid to lower mountainsides	Upper mountainsides & ridges
Slope	2 to 15 percent	—
Typical Vegetation	Shadscale (<i>Atriplex confertifolia</i>); Boxthorn (<i>Lycium</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline	—
Substratum	8 inches; hard fractured metasedimentary bedrock	—

Soil Properties

Restrictive Layer Depth	8 to 20 inches FB	—
Effective Rooting Depth (inches)	8 to 20 inches	—
Available Water Capacity	Very low to low (0.7 to 2.2 inches)	—
Water Retention Class	2 to 3 (0.7 to 2.2 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Slow to medium	—
Max Erosion Hazard	Moderate	—
Erosion Factor (k)		
Surface	0.24 (moderate)	—
Subsurface	0.15 (low)	—
T Value	1	—
Wind Erodability Group	4L	—

129 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability

Group
Class

IV

4PXde

IV

—

Range Interpretations

Productivity (lb/acre)

100 to 300

—

Suitability

Summer - Autumn

—

Most Limiting Factors

Plant competition; 30% shallow soils; 20%
rock outcrop

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Depth to rock

—

Picnic Areas

Moderate: Small stones

—

Paths & Trails

Moderate: Small stones

—

Engineering Interpretations

Unified Class

Surface

SC

—

Subsoil

SC

—

Substratum

—

—

AASHTO Class

Surface

A-4

—

Subsoil

A-4

—

Substratum

—

—

Suitability for

Sand

Unsuited

—

Gravel

Unsuited

—

Topsoil

Poor: Area reclaim; small stones

—

Roadfill

Poor: area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on middle mountainsides; the Blackston family, on colluvial positions of high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 30 percent of the map unit area.

130 - Lithic Camborthids - Rock outcrop, sedimentary association, 15 to 30 percent slopes

Elevation: 5,950 to 6,300 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Lithic Camborthids

Rock outcrop, sedimentary

Approx Proportion

50 percent

25 percent

Landscape Position

Mid to lower mountainsides

Upper mountainsides & ridges

Slope

15 to 30 percent

—

Typical Vegetation

Shadscale (*Atriplex confertifolia*); Boxthorn (*Lycium* spp.)

—

Soil Profile Description

Surface Layer

0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline

—

Substratum

8 inches; hard fractured metasedimentary bedrock

—

Soil Properties

Restrictive Layer Depth

8 to 20 inches FB

—

Effective Rooting Depth (inches)

8 to 20 inches

—

Available Water Capacity

Very low to low (0.7 to 2.2 inches)

—

Water Retention Class

2 to 3 (0.7 to 2.2 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.6 to 2.0

—

Drainage Class

Well drained

—

Runoff

Rapid

—

Max Erosion Hazard

Moderate

—

Erosion Factor (k)

Surface

0.24 (moderate)

—

Subsurface

0.15 (low)

—

T Value

1

—

Wind Erodability Group

4L

—

130 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4PXde

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

100 to 300 —
Summer - Autumn —
Plant competition; 50% shallow soils; 25% rock outcrop —

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Depth to rock —
Severe: Slope —
15-25% slopes: —
 Moderate - slope; small stones
25-30% slopes:
 Severe - slope

Engineering Interpretations

Unified Class
 Surface
 Subsoil
 Substratum
AASHTO Class
 Surface
 Subsoil
 Substratum
Suitability for
 Sand
 Gravel
 Topsoil
 Roadfill

SC —
SC —
— —
A-4 —
A-4 —
— —
Unsuited —
Unsuited —
Poor: Slope; area reclaim; small stones —
15-25% slopes: —
 Poor - area reclaim
25-30% slopes:
 Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on mid-mountainsides; the Blackston family, on colluvial mountainsides having high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

131 - Lithic Camborthids - Rock outcrop, sedimentary association, 30 to 60 percent slopes

Elevation: 4,600 to 7,200 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Lithic Camborthids

Rock outcrop, sedimentary

Landscape Position

Slope

Typical Vegetation

45 percent

30 percent

Mid to lower mountainsides

Upper mountainsides & ridges

30 to 60 percent

—

Shadscale (*Atriplex confertifolia*); Boxthorn (*Lycium* spp.)

—

Soil Profile Description

Surface Layer

0 to 3 inches; grayish brown gravelly loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

3 to 8 inches; pale brown very cobbly loam; moderate medium subangular blocky structure; moderately alkaline

—

Substratum

8 inches; hard fractured metasedimentary bedrock

—

Soil Properties

Restrictive Layer Depth

8 to 20 inches FB

—

Effective Rooting Depth (inches)

8 to 20 inches

—

Available Water Capacity

Very low to low (0.7 to 2.2 inches)

—

Water Retention Class

2 to 3 (0.7 to 2.2 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.6 to 2.0

—

Drainage Class

Well drained

—

Runoff

Rapid to Very Rapid

—

Max Erosion Hazard

Moderate to High

—

Erosion Factor (k)

Surface

0.24 (moderate)

—

Subsurface

0.15 (low)

—

T Value

1

—

Wind Erodability Group

4L

—

131 - Lithic Camborthids - Rock outcrop (continued)

Soil Manageability

Group
Class

IV

IV

4EPXdg

—

Range Interpretations

Productivity (lb/acre)

100 to 300

—

Suitability

Summer - Autumn

—

Most Limiting Factors

Plant competition; 45% shallow soils; 30%
rock outcrop; high erosion hazard; steep slope

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; Depth to rock

—

Picnic Areas

Severe: Slope

—

Paths & Trails

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

SC

—

Subsoil

SC

—

Substratum

—

—

AASHTO Class

Surface

A-4

—

Subsoil

A-4

—

Substratum

—

—

Suitability for

Sand

Unsuited

—

Gravel

Unsuited

—

Topsoil

Poor: Slope; Area reclaim; small stones

—

Roadfill

Poor: Slope; Area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on mid-mountainsides; the Blackston family, on colluvial mountainsides having high limestone concentrations; and Rubbleland-Scree, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

132 - Mackey - Unionville families complex, 3 to 15 percent slopes

Elevation: 5,750 to 8,450 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mackey family

45 percent

Upper alluvial fans

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Goldenbush (*Haplopappus* spp.)

Unionville family

30 percent

Lower alluvial fans; valley bottoms

3 to 15 percent

Juniper (*Juniperus* spp.); Big Sagebrush
(*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 3 inches; brown gravelly sandy loam;
weak fine granular structure; mildly alkaline

0 to 4 inches; brown gravelly sandy loam; weak
thin platy structure; moderately alkaline

Subsoil

3 to 42 inches; brown & yellowish brown
very gravelly sandy loam; weak medium
subangular blocky structure & massive; none
to slightly effervescent; mildly to moderately
alkaline.

4 to 26 inches; pale brown sandy loam; weak
medium subangular blocky structure; slightly
effervescent; moderately alkaline

Substratum

42 to 60 inches; light brownish gray
extremely gravelly loamy sand; massive;
strongly effervescent; moderately alkaline

26 to 60 inches; pale brown & light yellowish
brown gravelly sandy loam; massive; violently
effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

35 to 60+ inches HB

Effective Rooting
Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water
Capacity

Low (2.7 to 3.6 inches)

Low to moderate (2.8 to 6.3 inches)

Water Retention Class

2 (1.2 to 1.6 inches)

2 (1.8 to 2.4 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Medium

Slow to medium

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.05 (low)

0.17 (low)

Subsurface

0.10 (low)

0.32 (moderate)

T Value

4

2

Wind Erodability
Group

3

3

132 - Mackey - Unionville families complex (continued)

Soil Manageability
Group
Class

III
3Ep

III
3Ep

Range Interpretations

Productivity (lb/acre)

300 to 400

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Slight
8-15% slopes:
Moderate - slope

Picnic Areas

5-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Slight
8-15% slopes:
Moderate - Slope

Paths & Trails

Moderate: Small stones

Slight

Engineering Interpretations

Unified Class

Surface

SM

SM

Subsoil

SW-SM; SM-SC

SM

Substratum

GW-GM

SM

AASHTO Class

Surface

A-1-b; A-2-4

A-1-b; A-2-4

Subsoil

A-1-a; A-1-b; A-2-4

A-2-4

Substratum

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones

3-8% slopes:
Fair - small stones
8-15% slopes:
Fair - slope; small stones

Roadfill

Good

Good

Included Areas & Remarks

Included in this map unit are small areas of the Washoe family, on alluvial fans; the Bluewing family, in recent drainageways; and the Abgese family, 5 to 15 percent slopes, on upper alluvial fans. Included areas make up approximately 25 percent of the map unit area.

133 - Mackey - Washoe families complex, 3 to 15 percent slopes

Elevation: 5,400 to 7,200 feet Annual Precipitation: 9 to 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mackey family

55 percent

Old dissected alluvial fans

3 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Goldenbush (*Haplopappus* spp.)

Washoe family

25 percent

Stable old dissected alluvial fans

3 to 15 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline

0 to 4 inches; light brownish gray very gravelly sandy loam; weak very thin platy structure; neutral

Subsoil

3 to 42 inches: brown & yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline.

4 to 19 inches; light brown very gravelly clay loam & sandy clay loam; massive; neutral

Substratum

42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; moderately alkaline

19 to 60 inches; light yellowish brown extremely gravelly sandy loam & loamy sand; massive; strongly to violently effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

23 to 60+ inches FB

Effective Rooting Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water Capacity

Low (2.7 to 3.6 inches)

Very low to low (0.7 to 2.5 inches)

Water Retention Class

2 (1.2 to 1.6 inches)

2 (1.3 to 1.6 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Slow to Medium

Slow to Medium

Max Erosion Hazard

High

Moderate

Erosion Factor (k)

Surface

0.05 (low)

0.05 (low)

Subsurface

0.10 (low)

0.15 (low)

T Value

4

3

Wind Erodability Group

3

8

133 - Mackey - Washoe families complex (continued)

Soil Manageability
Group
Class

III
3Ep

III
2ep

Range Interpretations

Productivity (lb/acre)

300 to 400

400 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

3-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

3-8% slopes:
Moderate - small stones; percs slowly
8-15% slopes:
Moderate - slope; small stones; percs slowly

Picnic Areas

3-8% slopes:
Moderate small stones
8-15% slopes:
Moderate - slope; small stones

Moderate: Small stones

Paths & Trails

Moderate: Small stones

Moderate: Small stones

Engineering Interpretations

Unified Class

Surface

SM

GM; GW-GM

Subsoil

SW-SM; SM-SC

SC

Substratum

GW-GM

GP

AASHTO Class

Surface

A-1-b; A-2-4

A-1-a, A-1-b; A-2-4

Subsoil

A-1-a; A-1-b; A-2-4

A-2-6

Substratum

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Small stones

Poor: Small stones

Roadfill

Good

Good

Included Areas & Remarks

Included in this map unit are small areas of the Wrango family, on old dissected alluvial fans; and a soil similar to the Checkett family, but shallow to soft bedrock, on old dissected alluvial fans. Included areas make up approximately 20 percent of the map unit area.

134 - Mascamp - Sumine families complex, 15 to 40 percent slopes

Elevation: 8,550 to 9,200 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mascamp family

45 percent

Mountainsides

15 to 40 percent

Big Sagebrush (*Artemisia tridentata*);
Rabbitbrush (*Chrysothamnus* spp.)

Sumine family

30 percent

Mountainsides

15 to 40 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral

2 to 0 inches; Litter

0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral

Subsoil

7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral

3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam, & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline

Substratum

14 inches; hard fractured metasedimentary bedrock

52 inches; hard fractured shale bedrock

Soil Properties

Restrictive Layer Depth

13 to 20 inches FB

25 to 60 inches FB

Effective Rooting Depth (inches)

13 to 20 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.3 to 2.5 inches)

Low to high (2.8 to 8.3 inches)

Water Retention Class

1 to 2 (1.3 to 2.5 inches)

1 to 2 (2.1 to 2.6 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

Moderate

Moderate to High

Erosion Factor (k)

Surface

0.17 (low)

0.15 (low)

Subsurface

0.10 (low)

0.10 (low)

T Value

1

2

Wind Erodability Group

3

3

134 - Mascamp - Sumine families complex (continued)

Soil Manageability
Group
Class

II
2edp

II
2e

Range Interpretations

Productivity (lb/acre)

600 to 1000

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils

Plant competition; 45% shallow soils

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - small stones
25-40% slopes:
Severe - slope

15-25% slopes:
Moderate - slope
25-40% slopes:
Severe - slope

Engineering Interpretations

Unified Class

Surface

SC

SM

Subsoil

GM

GC

Substratum

—

—

AASHTO Class

Surface

A-4

A-4

Subsoil

A-2-6

A-7-6

Substratum

—

—

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope; small stones; area reclaim

Poor: Slope; small stones

Roadfill

15-25% slopes:
Poor - area reclaim
25-40% slopes:
Poor - slope; area reclaim

15-25% slopes:
Fair - slope
25-40% slopes:
Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of the Wenzel family, 5 to 15 percent slopes, in valley floors; the Trocken family, 2 to 5 percent slopes, on old dissected alluvial fans; and a soil similar to the Hymas family, but with mixed parent material, 30 to 40 percent slopes, on sideslopes of ridgetops. Included areas make up approximately 25 percent of the map unit area.

135 - Mascamp - Sumine families complex, 40 to 60 percent slopes

Elevation: 8,000 to 9,150 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Mascamp family	Sumine family
Approx Proportion	45 percent	30 percent
Landscape Position	Mountainsides	Mountainsides
Slope	40 to 60 percent	40 to 60 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral	2 to 0 inches; Litter 0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral
Subsoil	7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral	3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline
Substratum	14 inches; hard fractured metasedimentary bedrock	52 inches; hard fractured shale bedrock

Soil Properties

Restrictive Layer Depth	13 to 20 inches FB	25 to 60 inches FB
Effective Rooting Depth (inches)	13 to 20 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.3 to 2.5 inches)	Low to high (2.8 to 8.3 inches)
Water Retention Class	1 to 2 (1.3 to 2.5 inches)	1 to 2 (2.1 to 2.6 inches)
Hydrologic Soil Group	D	B
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained
Runoff	Rapid to very rapid	Rapid to very rapid
Max Erosion Hazard	Moderate to High	High
Erosion Factor (k)		
Surface	0.17 (low)	0.15 (low)
Subsurface	0.10 (low)	0.10 (low)
T Value	1	2
Wind Erodability Group	3	3

135 - Mascamp - Sumine families complex (continued)

Soil Manageability
Group
Class

III
3Edgpx

III
3Egx

Range Interpretations

Productivity (lb/acre)

600 to 1000

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils; 10%
rock outcrop; high erosion hazard; steep slopes

Plant competition; 45% shallow soils; 10% rock
outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: slope

Severe: slope

Picnic Areas

Severe: slope

Severe: slope

Paths & Trails

Severe: slope

Severe: slope

Engineering Interpretations

Unified Class

Surface

SC

SM

Subsoil

GM

GC

Substratum

—

—

AASHTO Class

Surface

A-4

A-4

Subsoil

A-2-6

A-7-6

Substratum

—

—

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope; small stones; area reclaim

Poor: Slope; small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Hymas family, but with mixed parent material, 5 to 15 percent slopes, on ridgetops; a soil similar to the Simpson family, but cooler, 5 to 15 percent slopes, on benches of mountainsides; and Rock outcrop and slate, on ridges and mountainsides. Included areas make up approximately 25 percent of the map unit area.

136 - Mascamp - Sumine families - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 7,200 to 11,000 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components	Mascamp family	Sumine family	Rock outcrop, metasedimentary
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Mountainsides	Mountainsides	Mountainsides & ridges
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 7 inches; brown gravelly loam; moderate medium granular structure; neutral	2 to 0 inches; Litter 0 to 3 inches; dark grayish brown gravelly fine sandy loam; weak fine subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	7 to 14 inches; yellowish brown very gravelly clay loam; weak fine granular structure; neutral	3 to 52 inches; grayish brown, brown, light yellowish brown & light brown gravelly sandy clay loam & gravelly, very gravelly, very stony & cobbly clay loams; moderate fine subangular blocky structure & massive; mildly to moderately alkaline.	—
Substratum	14 inches; hard fractured metasedimentary bedrock	52 inches; hard fractured shale bedrock	—

Soil Properties

Restrictive Layer Depth	13 to 20 inches FB	25 to 60 inches FB	—
Effective Rooting Depth (inches)	13 to 20 inches	20 to 40 inches	—
Available Water Capacity	Very low to low (1.3 to 2.5 inches)	Low to high (2.8 to 8.3 inches)	—
Water Retention Class	1 to 2 (1.3 to 2.5 inches)	1 to 2 (2.1 to 2.6 inches)	—
Hydrologic Soil Group	D	B	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	High	—
Erosion Factor (k)			
Surface	0.17 (low)	0.15 (low)	—
Subsurface	0.10 (low)	0.10 (low)	—
T Value	1	2	—
Wind Erodability Group	3	3	—

136 - Mascamp - Sumine families - Rock outcrop (continued)

Soil Manageability

Group	III	III	III
Class	3Edgpx	3Egx	—

Range Interpretations

Productivity (lb/acre)	600 to 1000	400 to 600	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 35% shallow soils; 15% rock outcrop; high erosion hazard; steep slopes	Plant competition; 35% shallow soils; 15% rock outcrop; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	Severe: Slope	—

Engineering Interpretations

Unified Class			
Surface	SC	SM	—
Subsoil	GM	GC	—
Substratum	—	—	—
AASHTO Class			
Surface	A-4	A-4	—
Subsoil	A-2-6	A-7-6	—
Substratum	—	—	—
Suitability for			
Sand	Unsuited	Unsuited	—
Gravel	Unsuited	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	Poor: Slope	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Hymas family, but with mixed parent material, on ridgetops; the Bearskin family, 15 to 30 percent slopes, on gentle sideslopes of ridges; the Toeja family, on upper mountainsides; the St. Marys family, on mountainsides; and the Wenzel family, 15 to 30 percent slopes, on mountainsides. Included areas make up approximately 30 percent of the map unit area.

Rock outcrop is slate.

137 - Merlin - Wenzel families - Rock outcrop, volcanic association, 5 to 60 percent slopes

Elevation: 7,350 to 11,360 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Merlin family	Wenzel family	Rock outcrop, volcanic
Approx Proportion	40 percent	25 percent	20 percent
Landscape Position	Plateau tops	Mountainsides	Ridges & mountainsides
Slope	5 to 30 percent	30 to 60 percent	30 to 60 percent
Typical Vegetation	Low Sagebrush (<i>Artemisia arbuscula</i>); Squirreltail (<i>Sitanion</i> spp.)	Curleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 4 inches; brown gravelly & very gravelly sandy loam; weak fine granular & subangular blocky structure; slightly to medium acid	0 to 4 inches; grayish brown gravelly sandy loam; moderate fine & medium subangular blocky structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	4 to 15 inches: brown gravelly clay loam; moderate fine and medium subangular blocky structure; neutral	4 to 29 inches; brown, yellowish brown very gravelly clay loam and clay; moderately fine & medium subangular blocky structure & strong fine & medium angular blocky structure; mildly to moderately alkaline	—
Substratum	15 inches; basalt bedrock	29 inches; hard fractured siltstone bedrock	—

Soil Properties

Restrictive Layer Depth	10 to 20 inches HB	20 to 30 inches FB	—
Effective Rooting Depth (inches)	10 to 20 inches	10 to 20 inches	—
Available Water Capacity	Very low to low (1.3 to 3.2 inches)	Very low to low (1.7 to 3.1 inches)	—
Water Retention Class	1 to 2 (1.3 to 3.2 inches)	2 (1.7 to 2.1 inches)	—
Hydrologic Soil Group	D	C	—
Permeability (in./hr.)	0.2 to 0.6	0.06 to 0.20	—
Drainage Class	Well drained	Well drained	—
Runoff	Medium to Rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate	High	—
Erosion Factor (k)			
Surface	0.02 (low)	0.05 (low)	—
Subsurface	0.24 (moderate)	0.10 (low)	—
T Value	1	1	—
Wind Erodability Group	8	8	—
Soil Manageability			
Group	III	III	III
Class	3Xedp	4EXgp	—

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137 - Merlin - Wenzel families - Rock outcrop (continued)

Range Interpretations			
Productivity (lb/acre)	200 to 250	600 to 1000	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 40% shallow soils; 20% rock outcrop; high erosion hazard; steep slopes	Plant competition; 40% shallow soils; 20% rock outcrop; high erosion hazard; steep slopes	

Recreation Interpretations - Limitations for

Camp Areas	5-8% slopes: Moderate - large & small stones; perc slowly	Severe: Slope	—
	8-15% slopes: Moderate - slope; large & small stones; perc slowly		
Picnic Areas	15-30% slopes: Severe - slope		
	5-8% slopes: Moderate - large & small stones; perc slowly	Severe: Slope	—
	8-15% slopes: Moderate - slope; large & small stones; perc slowly		
Paths & Trails	15-30% slopes: Severe - slope		
	5-15% slopes: Moderate - Large & small stones	Severe: Slope	—
	15-25% slopes: Moderate - slope: large & small stones		
	25-30% slopes: Severe - slope		

Engineering Interpretations

Unified Class			
Surface	SM-SC	SM	—
Subsoil	ML	SC	—
Substratum	—	—	—
AASHTO Class			
Surface	A-2-4; A-4	A-1-b; A-2-4	—
Subsoil	A-7-6	A-2-7	—
Substratum	—	—	—
Suitability for			
Sand	Unsuited	Unsuited	—
Gravel	Unsuited	Unsuited	—
Topsoil	5-15% slopes: Poor - small stones; area reclaim	Poor: Slope; small stones	—
	15-30% slopes: Poor - slope; small stones; area reclaim		
Roadfill	5-25% slopes: Poor - low strength; area reclaim	Poor: Slope; area reclaim	—
	25-30% slopes: Poor - slope; low strength; area reclaim		

Included Areas & Remarks

Included in this map unit are small areas of the Hartig family, 30 to 60 percent slopes, on mountainsides; and the Bearskin family, 5 to 30 percent slopes, on edges of mountainsides, between the Merlin and Wenzel families. Included areas make up approximately 15 percent of the map unit area.

Rock outcrop is olivine basalt.

138 - Mexispring family - Rock outcrop, granitic association, 15 to 30 percent slopes

Elevation: 4,400 to 6,900 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mexispring family

50 percent

Mountainsides

15 to 30 percent

Saltbrush (*Altriplex* spp.); Buckwheat (*Eriogonum* spp.); Mormon Tea (*Ephedra* spp.)

Rock outcrop, granitic

20 percent

Ridgetops, convex mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 11 inches; pale brown & very pale brown very gravelly loamy coarse sand & gravelly coarse sandy loam; massive; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

11 inches; Weathered, slightly fractured granodiorite (paralithic contact)

—

Soil Properties

Restrictive Layer Depth

8 to 12 inches PARA

—

Effective Rooting Depth (inches)

8 to 12 inches

—

Available Water Capacity

Very low (0.4 to 0.7 inches)

—

Water Retention Class

3 (0.4 to 0.7 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.17 (low)

—

T Value

1

—

Wind Erodability Group

2

—

138 - Mexispring family - Rock outcrop (continued)

Soil Manageability Group Class

IV	IV
4DEPX	—

Range Interpretations

Productivity (lb/acre)	200 to 350	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 50% shallow soils; 20% rock outcrop; high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	15-25% slopes: Moderate - slope; small stones 25-30% slopes: Severe - slope	—

Engineering Interpretations

Unified Class		
Surface	GW-GM	—
Subsoil	—	—
Substratum	SM	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Checkett family, but drier and shallow to soft bedrock, on benches of mountainsides and tops of knolls; a soil similar to the Mexispring family, but calcareous, on mountainsides; and a soil similar to the Trocken family, but with less than 35 percent rock fragments in the profile, 9 to 30 percent slopes, on lower mountainsides and toeslopes. Included areas make up approximately 30 percent of the map unit area.

139 - Mexispring family - Rock outcrop, granitic association, 30 to 60 percent slopes

Elevation: 4,500 to 5,400 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mexispring family

45 percent

Mountainsides

30 to 60 percent

Saltbrush (*Altriplex* spp.); Buckwheat (*Eriogonum* spp.); Mormon Tea (*Ephedra* spp.)

Rock outcrop, granitic

30 percent

Ridgetops, convex mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 11 inches; pale brown & very pale brown very gravelly loamy coarse sand & gravelly coarse sandy loam; massive; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

11 inches; Weathered, slightly fractured granodiorite (paralithic contact)

—

Soil Properties

Restrictive Layer Depth

8 to 12 inches PARA

—

Effective Rooting Depth (inches)

8 to 12 inches

—

Available Water Capacity

Very low (0.4 to 0.7 inches)

—

Water Retention Class

3 (0.4 to 0.7 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid to Very Rapid

—

Max Erosion Hazard

High to very high

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.17 (low)

—

T Value

1

—

Wind Erodability Group

2

—

139 - Mexispring family - Rock outcrop (continued)

Soil Manageability Group Class

IV	IV
4DEPXg	—

Range Interpretations

Productivity (lb/acre)	200 to 350	—
Suitability	Summer - Autumn	—
Most Limiting Factors	Plant competition; 45% shallow soils; 30% rock outcrop; very high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope	—

Engineering Interpretations

Unified Class		
Surface	GW-GM	—
Subsoil	—	—
Substratum	SM	—
AASHTO Class		
Surface	A-1-a; A-1-b; A-2-4	—
Subsoil	—	—
Substratum	A-1-b; A-2-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	—
Roadfill	Poor: Slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Mexispring family, but calcareous, on mountainsides; a soil similar to the Trocken family, but with less than 35 percent rock fragments in the profile, 15 to 30 percent slopes, on lower mountainsides and toeslopes; and a soil similar to the Checkett family, but drier and shallow to soft bedrock, 9 to 30 percent slopes, on benches of mountainsides and tops of knolls. Included areas make up approximately 25 percent of the map unit area.

140 - Mexispring family - Rock outcrop, granitic association, 60 to 80 percent slopes

Elevation: 4,500 to 6,400 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Mexispring family

45 percent

Mountainsides

60 to 80 percent

Saltbrush (*Altriplex* spp.); Buckwheat (*Eriogonum* spp.); Mormon Tea (*Ephedra* spp.)

Rock outcrop, granitic

35 percent

Ridgetops, convex mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 11 inches; pale brown & very pale brown very gravelly loamy coarse sand & gravelly coarse sandy loam; massive; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

11 inches; Weathered, slightly fractured granodiorite (paralithic contact)

—

Soil Properties

Restrictive Layer Depth

8 to 12 inches PARA

—

Effective Rooting Depth (inches)

8 to 12 inches

—

Available Water Capacity

Very low (0.4 to 0.7 inches)

—

Water Retention Class

3 (0.4 to 0.7 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Very Rapid

—

Max Erosion Hazard

Very high

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.17 (low)

—

T Value

1

—

Wind Erodability Group

2

—

140 - Mexispring family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4DEGPX

IV
—

Range Interpretations

Productivity (lb/acre)

200 to 350

—

Suitability

Summer - Autumn

—

Most Limiting Factors

Plant competition; 45% shallow soils; 35% rock outcrop; very high erosion hazard; very steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Picnic Areas

Severe: Slope

—

Paths & Trails

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

GW-GM

—

Subsoil

—

—

Substratum

SM

—

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

—

Subsoil

—

—

Substratum

A-1-b; A-2-4

—

Suitability for

Sand

Unsuited

—

Gravel

Unsuited

—

Topsoil

Poor: Slope; small stones; area reclaim

—

Roadfill

Poor: Slope; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to Mexispring family, but with a calcareous profile, on mountainsides; and a soil similar to the Trocken family, but with less than 35 percent rock fragments in the profile, on 30 to 60 percent slopes, on lower mountainsides and toeslopes. Included areas make up approximately 20 percent of the map unit area.

141 - Midas - Cath - Mackey families complex, 4 to 15 percent slopes

Elevation: 6,700 to 8,300 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Midas family	Cath family	Mackey family
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Old alluvial fans	Ridges of old dissected fans	Recent drainages
Slope	4 to 15 percent	4 to 15 percent	4 to 15 percent
Typical Vegetation	Fourwing Saltbush (<i>Atriplex canescens</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)

Soil Profile Description

Surface Layer	0 to 4 inches; pale brown very gravelly sandy loam; weak fine granular structure; strongly effervescent; moderately alkaline	0 to 3 inches; grayish brown gravelly sandy loam; weak thin platy structure; mildly alkaline	0 to 3 inches: brown gravelly sandy loam; weak fine granular structure; mildly alkaline
Subsoil	4 to 14 inches; light yellowish brown very gravelly sandy loam; massive; strongly effervescent; moderately alkaline	3 to 18 inches; yellowish brown gravelly clay loam & very gravelly loam; moderate medium subangular blocky structure; mildly to moderately alkaline	3 to 42 inches; brown and yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline
Substratum	14 to 60 inches; light yellowish brown very gravelly & extremely gravelly loamy sand; massive; moderately alkaline	18 to 60 inches; discontinuous duripan	42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; strongly effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	12 to 18 inches DP	Greater than 60 inches
Effective Rooting Depth (inches)	20 to 40 inches	12 to 18 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.8 to 2.4 inches)	Very low to low (1.4 to 2.6 inches)	Low (2.7 to 3.6 inches)
Water Retention Class	3 (1.0 to 1.2 inches)	1 to 2 (1.4 to 2.6 inches)	2 (1.2 to 1.6 inches)
Hydrologic Soil Group	B	D	B
Permeability (in./hr.)	2.0 to 6.0	Less than 0.06	2.0 to 6.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Slow to medium	Slow to medium	Slow to medium
Max Erosion Hazard	High	High	High
Erosion Factor (k)			
Surface	0.10 (low)	0.15 (low)	0.05 (low)
Subsurface	0.17 (low)	0.24 (moderate)	0.10 (low)
T Value	2	1	4
Wind Erodability Group	8	3	3

141 - Midas - Cath - Mackey families complex (continued)

Soil Manageability Group Class

IV
4EP

IV
3Edp

IV
3Ep

Range Interpretations

Productivity (lb/acre)

300 to 400

300 to 400

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Severe; Percs slowly

4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Picnic Areas

4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Paths & Trails

Moderate: Small stones

Moderate: Small stones

Moderate: Small stones

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GW-GM; GM-GC
SM-SC
SW-SM; SM-SC

SM
SC
—

SM
SW-SM; SM-SC
GW-GM

AASHTO Class
Surface
Subsoil
Substratum

A-1-a; A-1-b; A-2-4
A-2-4; A-4
A-1-a; A-1-b; A-2-4

A-1-b; A-2-4
A-2-6; A-6
—

A-1-b; A-2-4
A-1-a; A-1-b; A-2-4
A-1-a; A-1-b; A-2-4

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Unsuited
Poor: Small stones
4-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Unsuited
Unsuited
Poor: Area reclaim
Fair: Low strength

Unsuited
Unsuited
Poor: Small stones
Good

Included Areas & Remarks

Included in this map unit are small areas of the Washoe family, 4 to 15 percent slopes, on alluvial fans; the Midas, Cath and Mackey families, 15 to 30 percent slopes, on alluvial fans; a soil similar to the Midas family, but moister, on ballenas of older alluvial fans; and a soil similar to the Midas family, but moister and less than 20 inches to hardpan, on dissected alluvial fans and terraces. Included areas make up approximately 30 percent of the map unit area.

142 - Midas - Cath - Mackey families complex, 15 to 30 percent slopes

Elevation: 6,450 to 7,900 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Midas family	Cath family	Mackey family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Older alluvial fans	Ridges of old dissected fans	Ballena slideslopes & drainages
Slope	15 to 30 percent	15 to 30 percent	15 to 30 percent
Typical Vegetation	Fourwing Saltbush (<i>Atriplex canescens</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)	Big Sagebrush (<i>Artemisia tridentata</i>); Goldenbush (<i>Haplopappus</i> spp.)

Soil Profile Description

Surface Layer	0 to 4 inches; pale brown very gravelly sandy loam; weak fine granular structure; strongly effervescent; moderately alkaline	0 to 3 inches; grayish brown gravelly sandy loam; weak thin platy structure; mildly alkaline	0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline
Subsoil	4 to 14 inches; light yellowish brown very gravelly sandy loam; massive; strongly effervescent; moderately alkaline	3 to 18 inches; yellowish brown gravelly clay loam & very gravelly loam; moderate medium subangular blocky structure; mildly to moderately alkaline	3 to 42 inches; brown and yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline
Substratum	14 to 60 inches; light yellowish brown very gravelly & extremely gravelly loamy sand; massive; moderately alkaline	18 to 60 inches; discontinuous duripan	42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; strongly effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	12 to 18 inches DP	Greater than 60 inches
Effective Rooting Depth (inches)	20 to 40 inches	12 to 18 inches	20 to 40 inches
Available Water Capacity	Very low to low (1.8 to 2.4 inches)	Very low to low (1.4 to 2.6 inches)	Low (2.7 to 3.6 inches)
Water Retention Class	3 (1.0 to 1.2 inches)	1 to 2 (1.4 to 2.6 inches)	2 (1.2 to 1.6 inches)
Hydrologic Soil Group	B	D	B
Permeability (in./hr.)	2.0 to 6.0	0.2 to 0.6	2.0 to 6.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid	Rapid	Rapid
Max Erosion Hazard	High to very high	High	High
Erosion Factor (k)			
Surface	0.10 (low)	0.15 (low)	0.05 (low)
Subsurface	0.17 (low)	0.24 (moderate)	0.10 (low)
T Value	2	1	4
Wind Erodability Group	8	3	3

142 - Midas - Cath - Mackey families complex (continued)

Soil Manageability Group Class

IV
4EP

IV
3Edp

IV
3Ep

Range Interpretations

Productivity (lb/acre)

300 to 400

300 to 400

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; Percs slowly

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GW-GM; GM-GC
SM-SC
SW-SM; SM-SC

SM
SC
—

SM
SW-SM; SM-SC
GW-GM

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

A-1-b; A-2-4

Subsoil

A-2-4; A-4

A-2-6; A-6

A-1-a; A-1-b; A-2-4

Substratum

A-1-a; A-1-b; A-2-4

—

A-1-a; A-1-b; A-2-4

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Unsuited
Poor: Slope; Small stones
15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope; small stones

Unsuited
Unsuited
Poor: Slope; Area reclaim
15-25% slopes:
Fair - slope; low strength
25-30% slopes:
Poor - slope

Unsuited
Unsuited
Poor: Slope; Small stones
15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of the Washoe family, on alluvial fans; a soil similar to the Midas family, but moister, 9 to 15 percent slopes, on ballenas of old alluvial fans; and a soil similar to the Midas family, but moister and less than 20 inches deep to hardpan, on dissected alluvial fans and terraces. Included areas make up approximately 20 percent of the map unit area.

143 - Moano family - Rock outcrop, sedimentary complex, 60 to 80 percent slopes

Elevation: 4,700 to 8,000 feet Annual Precipitation: 8 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Moano family

40 percent

Ridgetops & mountainsides

60 to 80 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush *Artemisia tridentata*

Rock outcrop, sedimentary

40 percent

Ridgetops & mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 3 inches; light yellowish brown loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

3 to 12 inches; brownish yellow very cobbly clay loam; massive; moderately alkaline

—

12 inches; hard quartzitic sandstone bedrock

Soil Properties

Restrictive Layer Depth

12 to 14 inches HB

—

Effective Rooting Depth (inches)

12 to 14 inches

—

Available Water Capacity

Very low (1.3 to 2.0 inches)

—

Water Retention Class

2 (1.3 to 2.0 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.2 to 0.6

—

Drainage Class

Well drained

—

Runoff

Very Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.15 (low)

—

Subsurface

0.15 (low)

T Value

1

—

Wind Erodability Group

8

—

143 - Moano family - Rock outcrop (continued)

Soil Manageability

Group
Class

IV

IV

4EGXdp

—

Range Interpretations

Productivity (lb/acre)

300 to 500

—

Suitability

Summer - Autumn

—

Most Limiting Factors

Plant competition; 40% shallow soils; 40% rock outcrop; high erosion hazard; very steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Picnic Areas

Severe: Slope

—

Paths & Trails

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

CL

—

Subsoil

—

—

Substratum

SC

—

AASHTO Class

Surface

A-4

—

Subsoil

—

—

Substratum

A-6

—

Suitability for

Sand

Unsuited

—

Gravel

Unsuited

—

Topsoil

Poor: Slope; small stones; area reclaim

—

Roadfill

Poor: Slope; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of the Finley family, on stable mid to lower mountainsides; and a soil similar to the Trocken family, but moister, on mid to lower mountainsides. Included areas make up approximately 20 percent of the map unit area.

Rock outcrop percentage includes rubbleland.

144 - Mulett - Checkett families - Rock outcrop, granitic complex, 60 to 80 percent slopes

Elevation: 5,200 to 7,800 feet Annual Precipitation: 8 inches

Soil Map Unit Components	Mulett family	Checkett family	Rock outcrop, granitic
Approx Proportion	30 percent	30 percent	20 percent
Landscape Position	Mountainsides	Mountainsides	Ridges & mountainsides
Slope	60 to 80 percent	60 to 80 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 6 inches; pale brown sandy loam & very gravelly sandy clay loam; weak fine granular structure; mildly alkaline	0 to 6 inches; pale brown gravelly fine sandy loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	6 to 13 inches; light yellowish brown very gravelly clay loam; moderate medium subangular blocky structure; mildly alkaline	6 to 19 inches; yellowish brown very gravelly & very cobbly sandy clay loam; moderate medium subangular blocky structure; moderately alkaline	—
Substratum	13 inches; hard noncalcareous sedimentary bedrock	19 inches; hard metasedimentary bedrock	—

Soil Properties

Restrictive Layer Depth	10 to 20 inches HB	9 to 19 inches HB	—
Effective Rooting Depth (inches)	10 to 20 inches	9 to 19 inches	—
Available Water Capacity	Very low to low (1.0 to 2.5 inches)	Very low to low (0.8 to 2.1 inches)	—
Water Retention Class	1 to 3 (1.0 to 2.5 inches)	2 to 3 (0.8 to 2.1 inches)	—
Hydrologic Soil Group	D	D	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Very rapid	Very rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.15 (low)	0.15 (low)	—
Subsurface	0.10 (low)	0.10 (low)	—
T Value	1	1	—
Wind Erodability Group	3	8	—

144 - Mulett - Checkett families - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EGXdp

IV
4EGPXd

IV
—

Range Interpretations

Productivity (lb/acre)

300 to 500

300 to 500

—

Suitability

Summer - Autumn

Summer - Autumn

—

Most Limiting Factors

Plant competition; 60% shallow
soils; 20% rock outcrop; high
erosion hazard; very steep
slopes

Plant competition; 60%
shallow soils; 20% rock
outcrop; high erosion hazard;
very steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; Too sandy

—

Picnic Areas

Severe: Slope

Severe: Slope; Too sandy

—

Paths & Trails

Severe: Slope

Severe: Slope; Too sandy

—

Engineering Interpretations

Unified Class

Surface

SM-SC

SM-SC

—

Subsoil

SC

SC

—

Substratum

—

—

—

AASHTO Class

Surface

A-2-4

A-2-4; A-4

—

Subsoil

A-2-6

A-2-4

—

Substratum

—

—

—

Suitability for

Sand

Unsuited

Unsuited

—

Gravel

Unsuited

Unsuited

—

Topsoil

Poor: Slope; small stones; area
reclaim

Poor: Slope; small stones

—

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Mexispring family, but calcareous, on mountainsides at lower elevations; a soil similar to the Packham family, but slightly drier, on mountainsides at higher elevations; and rubbleland, on mountainsides. Included areas make up approximately 20 percent of the map unit area.

145 - Mulett - Toeja families - Rubbleland association, 15 to 80 percent slopes

Elevation: 7,120 to 9,370 feet Annual Precipitation: 8 to 11 inches

Soil Map Unit Components	Mulett family	Toeja family	Rubbleland
Approx Proportion	40 percent	25 percent	15 percent
Landscape Position	Southerly & westerly-facing mountainsides	Mountain tops & benches	Mountainsides, mostly on northerly & easterly facing aspects
Slope	30 to 80 percent	15 to 30 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Curlleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>) Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 6 inches; pale brown sandy loam & very gravelly sandy clay loam; weak fine granular structure; mildly alkaline	1 to 0 inch; Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline	Rubbleland consists of areas of detached rock fragments (colluvium) which have accumulated on steep to very steep mountainsides as talus. These areas support little or no vegetation and are subject to landslides
Subsoil	6 to 13 inches; light yellowish brown very gravelly clay loam; moderate medium subangular blocky structure; mildly alkaline	12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline	—
Substratum	13 inches; hard noncalcareous sedimentary bedrock	22 inches; Weathered rhyolite (paralithic contact)	—

Soil Properties

Restrictive Layer Depth	10 to 20 inches HB	21 to 24 inches PARA	—
Effective Rooting Depth (inches)	10 to 20 inches	21 to 24 inches	—
Available Water Capacity	Very low to low (1.0 to 2.5 inches)	Low (2.4 to 3.4 inches)	—
Water Retention Class	1 to 3 (1.0 to 2.5 inches)	1 to 2 (2.1 to 2.7 inches)	—
Hydrologic Soil Group	D	C	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid	—
Max Erosion Hazard	Moderate to High	High	—
Erosion Factor (k)			
Surface	0.15 (low)	0.10 (low)	—
Subsurface	0.10 (low)	0.28 (moderate)	—
T Value	1	2	—
Wind Erodability Group	3	8	—

145 - Mulett - Toeja families - Rubbleland association (continued)

Soil Manageability			
Group	IV	IV	IV
Class	4EGdpx	3Ex	—

Range Interpretations

Productivity (lb/acre)	300 to 500	600 to 1000	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 65% shallow soils; 15% rubbleland; high erosion hazard; very steep slopes	Plant competition; 65% shallow soils; 15% rubbleland; high erosion hazard; very steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	Severe: Slope	—
Picnic Areas	Severe: Slope	Severe: Slope	—
Paths & Trails	Severe: Slope	15-25% slopes: Moderate - slope; large stones 25-30% slopes: Severe - slope	—

Engineering Interpretations

Unified Class			
Surface	SM-SC	SM	—
Subsoil	SC	SM	—
Substratum	—	—	—
AASHTO Class			
Surface	A-2-4	A-4	—
Subsoil	A-2-6	A-2-7	—
Substratum	—	—	—
Suitability for			
Sand	Unsuited	Poor: Excess fines	—
Gravel	Unsuited	Unsuited	—
Topsoil	Poor: Slope; small stones; area reclaim	Poor: Slope; small stones	—
Roadfill	Poor: Slope; area reclaim	15-25% slopes: Poor - area reclaim 25-30% slopes: Poor - slope; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Sumine family, 30 to 60 percent slopes, on northerly and easterly-facing mountain toeslopes; and the Hartig family, 60 to 80 percent slopes, on upper mountainsides. Included areas make up approximately 20 percent of the map unit area.

Rubbleland is andesite.

146 - Packham - Slinger families - Rock outcrop, granitic association, 30 to 60 percent slopes

Elevation: 6,400 to 12,320 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Packham family	Slinger family	Rock outcrop, granitic
Approx Proportion	30 percent	20 percent	20 percent
Landscape Position	Northerly and easterly-facing mountainsides	Southerly and westerly-facing mountainsides	Mountainsides, ridges and canyon escarpments
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thin platy structure; neutral	1 to 0 inch; Litter 0 to 14 inches; pale brown very gravelly sandy loam; weak fine granular structure & massive; slightly to strongly effervescent; mildly alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral	—	—
Substratum	15 to 60+ inches; light yellowish brown & very pale brown gravelly & extremely gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline	14 to 60 inches; light gray, very pale brown very gravelly sandy loam; massive; violently effervescent; moderately alkaline	—

Soil Properties

Restrictive Layer Depth	30 to 60 inches FB	35 to 60+ inches FB	—
Effective Rooting Depth (inches)	20 to 50 inches	35 to 60 inches	—
Available Water Capacity	Very low to low (1.3 to 3.3 inches)	Very low to low (1.7 to 3.5 inches)	—
Water Retention Class	2 to 3 (1.0 to 1.2 inches)	2 (1.2 to 1.4 inches)	—
Hydrologic Soil Group	B	B	—
Permeability (in./hr.)	0.2 to 0.6	2.0 to 6.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	Moderate to High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.10 (low)	—
Subsurface	0.05 (low)	0.10 (low)	—
T Value	3	4	—
Wind Erodability Group	8	8	—

146 - Packham - Slinger families - Rock outcrop (continued)

Soil Manageability Group Class

IV
4PXeg

IV
3Xegp

IV
—

Range Interpretations

Productivity (lb/acre)

500 to 700

500 to 700

—

Suitability

Summer - Autumn

Summer - Autumn

—

Most Limiting Factors

Plant competition; 20% rock
outcrop; high erosion hazard;
steep slopes

Plant competition; 20% rock
outcrop; high erosion hazard;
steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

—

Picnic Areas

Severe: Slope

Severe: Slope

—

Paths & Trails

Severe: Slope; large stones

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

GM; GW-GM

SM; SW-SM

—

Subsoil

GM; GW-GM

—

—

Substratum

GM; GW-GM

GM; GW-GM

—

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

—

Subsoil

A-2-6

—

—

Substratum

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

—

Suitability for

Sand

Unsuited

Unsuited

—

Gravel

Poor: Excess fines

Poor: Excess fines

—

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones

—

Roadfill

Poor: Slope

Poor: Slope

—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Soakpak family, but warmer, 30 to 80 percent slopes, on upper mountainsides at elevations of greater than 9,500 feet; a soil similar to the Moano family, but moister, 50 to 75 percent slopes, on steep eroded mountainsides; and granitic rubbleland, directly beneath rock outcropping. Included areas make up approximately 30 percent of the map unit area.

147 - Packham - Spaa families - Rock outcrop, granitic association, 30 to 60 percent slopes

Elevation: 6,000 to 9,400 feet Annual Precipitation: 9 to 11 inches

Soil Map Unit Components	Packham family	Spaa family	Rock outcrop, granitic
Approx Proportion	35 percent	25 percent	15 percent
Landscape Position	Southerly and westerly-facing mountainsides	Northerly and easterly-facing mountainsides	Ridges and mountainsides
Slope	30 to 60 percent	30 to 60 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Wheatgrass (<i>Agropyron</i> spp.)	Curleaf Mountain Mahogany (<i>Cercocarpus leditolius</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thin platy structure; neutral	0 to 3 inches: brown very cobbly sandy loam; weak medium & coarse platy structure; medium acid	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	3 to 15 inches; yellowish brown very gravelly & extremely gravelly sandy clay loam; massive; neutral	—	—
Substratum	15 to 60+ inches; light yellowish brown & very pale brown gravelly & extremely gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline	3 to 16 inches; brown & pale brown sandy loam & gravelly sandy loam; weak fine & medium sugangular blocky structure; slightly acid 16 inches; hard rhyolite bedrock	—

Soil Properties

Restrictive Layer Depth	30 to 60+ inches FB	12 to 16 inches HB	—
Effective Rooting Depth (inches)	20 to 50 inches	10 to 16 inches	—
Available Water Capacity	Very low to low (1.3 to 3.3 inches)	Very low (0.9 to 1.6 inches)	—
Water Retention Class	2 to 3 (1.0 to 1.2 inches)	2 to 3 (0.9 to 1.6 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	2.0 to 6.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to very rapid	Rapid to very rapid	—
Max Erosion Hazard	Moderate to High	High	—
Erosion Factor (k)			
Surface	0.05 (low)	0.10 (low)	—
Subsurface	0.05 (low)	0.24 (moderate)	—
T Value	3	1	—
Wind Erodability Group	8	8	—

147 - Packham - Spaa families - Rock outcrop (continued)

Soil Manageability Group Class

III
3Pegx

III
4EPdgx

III
—

Range Interpretations

Productivity (lb/acre)

500 to 700

600 to 1000

—

Suitability

Summer - Autumn

Summer - Autumn

—

Most Limiting Factors

Plant competition; 25% shallow
soils; 15% rock outcrop; high
erosion hazard; steep slopes

Plant competition; 25%
shallow soils; 15% rock
outcrop; high erosion hazard;
steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

—

Picnic Areas

Severe: Slope

Severe: Slope

—

Paths & Trails

Severe: Slope; large stones

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

GM; GW-GM

SM; SW-SM

—

Subsoil

GM; GW-GM

—

—

Substratum

GM; GW-GM

SM

—

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

—

Subsoil

A-2-6

—

—

Substratum

A-1-a; A-1-b; A-2-4

A-2-4

—

Suitability for

Sand

Unsuited

Poor: Excess fines

—

Gravel

Poor: Excess fines

Unsuited

—

Topsoil

Poor: Slope; small stones

Poor: Slope; small stones;
area reclaim

—

Roadfill

Poor: Slope

Poor: Slope; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of the Bartine family, on northerly and easterly-facing mountainsides, at higher elevations; a soil similar to the Spaa family, but shallow to soft bedrock, on southerly and westerly-facing mountainsides; and a soil similar to the St. Marys family, but warmer and with a thicker dark surface layer, on 15 to 30 percent slopes, in floodplains between mountainsides. Included areas make up approximately 25 percent of the map unit area.

148 - Pergelic Cryoborolls - Rock outcrop, metasedimentary association, 30 to 60 percent slopes

Elevation: 9,000 to 13,100 feet Annual Precipitation: 15 to 18 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Pergelic Cryoborolls

55 percent

Mountainsides

30 to 60 percent

Goldenbush (*Haplopappus* spp.); Pringle Bluegrass (*Poa pringleii*); Buckwheat (*Eriogonum* spp.)

Rock outcrop, metasedimentary

25 percent

Ridges and upper mountainsides

—

—

Soil Profile Description

Surface Layer

1 to 0 inches; Root mat

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

0 to 2 inches; dark grayish brown very stony loam; moderate medium & coarse subangular blocky structure; neutral

Subsoil

2 to 14 inches; brown & yellowish brown very stony loam; moderate fine, medium & coarse subangular blocky structure; neutral to slightly acid

—

Substratum

14 to 39 inches; pale brown very stony & extremely stony loam; moderate fine & medium subangular blocky structure; slightly to strongly acid

—

39 inches; hard fractured granodiorite bedrock

Soil Properties

Restrictive Layer Depth

35 to 60+ inches FB

—

Effective Rooting Depth (inches)

20 to 40 inches

—

Available Water Capacity

Low (2.0 to 3.5 inches)

—

Water Retention Class

2 (1.4 to 1.8 inches)

—

Hydrologic Soil Group

B

—

Permeability (in./hr.)

0.6 to 2.0

—

Drainage Class

Well drained

—

Runoff

Rapid to Very Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.17 (low)

—

Subsurface

0.10 (low)

—

T Value

4

—

Wind Erodability Group

8

—

148 - Pergelic Cryoborolls - Rock outcrop (continued)

Soil Manageability Group Class

IV	IV
4EXgp	—

Range Interpretations

Productivity (lb/acre)	75 to 100	—
Suitability	Summer	—
Most Limiting Factors	20% rock outcrop; 10% rubbleland; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope; large stones	—

Engineering Interpretations

Unified Class		
Surface	SM	—
Subsoil	SC	—
Substratum	SM-SC	—
AASHTO Class		
Surface	A-4	—
Subsoil	A-2-4	—
Substratum	A-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; large & small stones	—
Roadfill	Poor: Slope; large stones; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Soakpak family, 5 to 30 percent slopes, on alluvial-colluvial flats; and metasedimentary rubbleland, in concave positions, below rock outcroppings. Included areas make up approximately 20 percent of the map unit area.

149 - Pergelic Cryoborolls - Rubbleland, metasedimentary complex, 30 to 60 percent slopes

Elevation: 10,900 to 12,400 feet Annual Precipitation: 12 to 18 inches

Soil Map Unit Components	Pergelic Cryoborolls	Rubbleland, metasedimentary
Approx Proportion	40 percent	40 percent
Landscape Position	Mountainsides	Mountainsides
Slope	30 to 60 percent	—
Typical Vegetation	Goldenbush (<i>Haplopappus</i> spp.); Pringle Bluegrass (<i>Poa pringleii</i>); Buckwheat (<i>Eriogonum</i> spp.)	—

Soil Profile Description

Surface Layer	1 to 0 inches; Root mat 0 to 2 inches; dark grayish brown very stony loam; moderate medium & coarse subangular blocky structure; neutral	Rubbleland consists of areas of detached rock fragments (colluvium) which have accumulated on steep to very steep mountainsides as talus. These areas support little or no vegetation and are subject to landslides.
Subsoil	2 to 14 inches; brown, yellowish brown very stony loam; moderate fine, medium & coarse subangular blocky structure; neutral to slightly acid	—
Substratum	14 to 39 inches; pale brown very stony & extremely stony loam; moderate fine & medium subangular blocky structure; slightly to strongly acid 39 inches; hard fractured granodiorite bedrock	—

Soil Properties

Restrictive Layer Depth	35 to 60+ inches FB	—
Effective Rooting Depth (inches)	20 to 40 inches	—
Available Water Capacity	Low (2.0 to 3.5 inches)	—
Water Retention Class	2 (1.4 to 1.8 inches)	—
Hydrologic Soil Group	B	—
Permeability (in./hr.)	0.6 to 2.0	—
Drainage Class	Well drained	—
Runoff	Rapid to Very Rapid	—
Max Erosion Hazard	High	—
Erosion Factor (k)		
Surface	0.17 (low)	—
Subsurface	0.10 (low)	—
T Value	4	—
Wind Erodability Group	8	—

149 - Pergelic Cryoborolls - Rubbleland (continued)

Soil Manageability		
Group	IV	IV
Class	4EXgp	—

Range Interpretations

Productivity (lb/acre)	75 to 100	—
Suitability	Summer	—
Most Limiting Factors	40% rubbleland; high erosion hazard; steep slopes	—

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope	—
Picnic Areas	Severe: Slope	—
Paths & Trails	Severe: Slope; large stones	—

Engineering Interpretations

Unified Class		
Surface	SM	—
Subsoil	SC	—
Substratum	SM-SC	—
AASHTO Class		
Surface	A-4	—
Subsoil	A-2-4	—
Substratum	A-4	—
Suitability for		
Sand	Unsuited	—
Gravel	Unsuited	—
Topsoil	Poor: Slope; large & small stones	—
Roadfill	Poor: Slope; large stones; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of Swift Creek family and dolomite rock outcrop. Included areas make up approximately 20 percent of the map unit area.

150 - Pergelic Cryoborolls - Soakpak family association, 5 to 70 percent slopes

Elevation: 10,800 to 13,200 feet Annual Precipitation: 12 to 18 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Pergelic Cryoborolls

55 percent

Mountainsides

30 to 70 percent

Goldenbush (*Haplopappus* spp.); Buckwheat (*Eriogonum* spp.); Pringle Bluegrass (*Poa pringleii*)

Soakpak family

25 percent

Colluvial-alluvial mountain flats

5 to 30 percent

Carex (*Carex* spp.); Low Phlox (*Phlox hoodii*); Pringle Bluegrass (*Poa pringleii*)

Soil Profile Description

Surface Layer

1 to 0 inches; Root mat

0 to 2 inches; dark grayish brown very stony loam; moderate medium & coarse subangular blocky structure; neutral

0 to 9 inches; grayish brown & brown, extremely cobbly & very gravelly sandy loam; moderate fine & medium, & weak very fine & fine subangular blocky structure; slightly to medium acid

Subsoil

2 to 14 inches; brown & yellowish brown very stony loam; moderate fine, medium & coarse subangular blocky structure; neutral to slightly acid

9 to 27 inches; pale brown very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid

Substratum

14 to 39 inches; pale brown very stony & extremely stony loam; moderate fine & medium subangular blocky structure; slightly to strongly acid

27 to 42 inches; light gray very gravelly sandy loam; weak very fine & fine subangular blocky structure; medium acid

39 inches; hard fractured granodiorite bedrock

42 inches; hard fractured granodiorite bedrock

Soil Properties

Restrictive Layer Depth

35 to 60+ inches FB

30 to 60+ inches FB

Effective Rooting Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water Capacity

Low (2.0 to 3.5 inches)

Very low to moderate (1.7 to 4.2 inches)

Water Retention Class

2 (1.4 to 1.8 inches)

2 (1.3 to 1.6 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

0.6 to 2.0

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Medium to Rapid

Max Erosion Hazard

High

Moderate

Erosion Factor (k)

Surface

0.17 (low)

0.17 (low)

Subsurface

0.10 (low)

0.10 (low)

T Value

4

4

Wind Erodability Group

8

8

150 - Pergelic Cryoborolls - Soakpak family association (continued)

Soil Manageability
Group
Class

III
3Egpx

III
2epx

Range Interpretations

Productivity (lb/acre)

75 to 100

75 to 100

Suitability

Summer

Summer

Most Limiting Factors

10% rock outcrop; high erosion hazard; steep slopes

10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

5-8% slopes:
Moderate - large & small stones
8-15% slopes:
Moderate - slope; large & small stones

Picnic Areas

Severe: Slope

5-8% slopes:
Moderate - large & small stones
8-15% slopes:
Moderate - slope; large & small stones

Paths & Trails

Severe: Slope; large stones

Moderate: Large & small stones

Engineering Interpretations

Unified Class

Surface

SM

SM-SC

Subsoil

SC

GW-GM; GM-GC

Substratum

SM-SC

GW-GM; GM-GC

AASHTO Class

Surface

A-4

A-4

Subsoil

A-2-4

A-2-4

Substratum

A-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope; large & small stones

Poor: Small stones

Roadfill

Poor: Slope; large stones; area reclaim

Fair: area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Soakpak family, 30 to 50 percent slopes, on transitional areas between colluvial-alluvial flats and mountainsides; Pergelic Cryoborolls, 5 to 30 percent slopes, on benches of mountainsides; and rock outcrop, on ridges and mountain tops. Included areas make up approximately 20 percent of the map unit area.

151 - Preston family, 1 to 15 percent slopes

Elevation: 6,430 to 7,640 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Preston family

80 percent

Stabilized sand dunes

1 to 15 percent

Big Sagebrush (*Artemisia tridentata*); Indian Ricegrass (*Oryzopsis hymenoides*)

Soil Profile Description

Surface Layer

0 to 6 inches; pale brown sand; weak very fine granular structure & single grained; neutral

Subsoil

—

Substratum

6 to 60 inches; pale brown, light brownish gray, light gray fine sand and sand; single grained; neutral

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Effective Rooting Depth (inches)

40 to 60 inches

Available Water Capacity

Low to moderate (3.0 to 4.8 inches)

Water Retention Class

2 to 3 (1.0 to 1.6 inches)

Hydrologic Soil Group

A

Permeability (in./hr.)

6.0 to 20.0

Drainage Class

Somewhat Excessive

Runoff

Slow to Medium

Max Erosion Hazard

Moderate

Erosion Factor (k)

Surface

0.10 (low)

Subsurface

0.10 (low)

T Value

3

Wind Erodability Group

1

151 - Preston family (continued)

Soil Manageability
Group
Class

III
3Pe

Range Interpretations

Productivity (lb/acre)

400 to 800

Suitability

Summer - Autumn

Most Limiting Factors

Plant competition; 30% shallow soils; 5%
rock outcrop

Recreation Interpretations - Limitations for

Camp Areas

Severe: Too sandy

Picnic Areas

Severe: Too sandy

Paths & Trails

Severe: Too sandy

Engineering Interpretations

Unified Class

Surface

SM; SW-SW

Subsoil

—

Substratum

SM

AASHTO Class

Surface

A-2-4

Subsoil

—

Substratum

A-2-4

Suitability for

Sand

Poor: Excess fines

Gravel

Unsuited

Topsoil

Poor: Too sandy

Roadfill

Good

Included Areas & Remarks

Included in this map unit are small areas of Durargidic Argixerolls, 9 to 15 percent slopes, in transitional areas between sand dunes; the Wrango family, 5 to 15 percent slopes, on alluvial transitional areas; and a soil similar to the Wrango family, but with stratified layers, in alluvial drainageways. Included areas make up approximately 20 percent of the map unit area.

152 - Risue - Abgese - Preston families association, 2 to 15 percent slopes

Elevation: 6,680 to 7,920 feet Annual Precipitation: 10 inches

Soil Map Unit Components	Risue family	Abgese family	Preston family
Approx Proportion	30 percent	25 percent	25 percent
Landscape Position	Lava flows	Sideslopes of lava flows	Depressions
Slope	2 to 10 percent	9 to 15 percent	2 to 5 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	Big Sagebrush (<i>Artemisia tridentata</i>); Singleleaf Pinyon Pine (<i>Pinus monophylla</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Indian Ricegrass (<i>Oryzopsis hymenoides</i>)

Soil Profile Description

Surface Layer	0 to 6 inches; pale brown cobbly loamy sand & loamy sand; weak very fine granular & weak fine & medium subangular blocky structure; neutral	0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline	0 to 6 inches; pale brown sand; weak very fine granular structure & single grained; neutral
Subsoil	6 to 16 inches; yellowish brown, brown sandy clay loam & clay; strong very fine, fine, medium & coarse subangular blocky structure; neutral	5 to 16 inches; yellowish brown sandy loam & gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline	—
Substratum	16 inches; strong brown silica-cemented hardpan	16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline	6 to 60 inches; pale brown, light brownish gray, light gray fine sand & sand; single grained; neutral

Soil Properties

Restrictive Layer Depth	16 inches DP	Greater than 60 inches	Greater than 60 inches
Effective Rooting Depth (inches)	16 inches	40 to 60 inches	40 to 60 inches
Available Water Capacity	Very low (1.6 to 2.0 inches)	Moderate (4.6 to 5.7 inches)	Low to moderate (3.0 to 4.8 inches)
Water Retention Class	2 (1.6 to 2.0 inches)	2 (1.7 to 2.1 inches)	2 to 3 (1.0 to 1.6 inches)
Hydrologic Soil Group	D	B	A
Permeability (in./hr.)	Less than 0.06	2.0 to 6.0	6.0 to 20.0
Drainage Class	Well drained	Well drained	Somewhat Excessive
Runoff	Slow to Medium	Medium	Slow to Medium
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (k)			
Surface	0.10 (low)	0.15 (low)	0.10 (low)
Subsurface	0.15 (low)	0.17 (low)	0.10 (low)
T Value	1	3	3
Wind Erodability Group	8	3	1

152 - Risue - Abgese - Preston families association (continued)

Soil Manageability Group Class

II
2edpx

II
2epx

II
3Pex

Range Interpretations

Productivity (lb/acre)

500 to 700

500 to 700

400 to 800

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 30% shallow
soils; 5% rock outcrop

Plant competition; 30%
shallow soils; 5% rock outcrop

Plant competition; 30% shallow
soils; 5% rock outcrop

Recreation Interpretations - Limitations for

Camp Areas

Severe: Percs slowly

Moderate: Slope

Severe: Too sandy

Picnic Areas

2-8% slopes:
Moderate - small stones;
too sandy
8-10% slopes:
Moderate - slope;
small stones; too sandy

Moderate: Slope

Severe: Too sandy

Paths & Trails

Moderate: Large stones; too
sandy

Slight

Severe: Too sandy

Engineering Interpretations

Unified Class

Surface

SM

SM-SC

SM; SW-SM

Subsoil

ML

SM-SC

—

Substratum

SC

SM

SM

AASHTO Class

Surface

A-2-4

A-2-4

A-2-4

Subsoil

A-7-6

A-2-4

—

Substratum

A-4

A-1-b; A-2-4

A-2-4

Suitability for

Sand

Unsuited

Unsuited

Poor: Excess fines

Gravel

Unsuited

Unsuited

Unsuited

Topsoil

Poor: area reclaim

Fair: Slope; small stones

Poor: Too sandy

Roadfill

Poor: Low strength; area
reclaim

Good

Good

Included Areas & Remarks

Included in this map unit are small areas of the Abgese family, with an overburden of the Preston family, 9 to 15 percent slopes, on sideslopes of lava flows; Abgese family, 15 to 30 percent slopes, on sideslopes of lava flows; and basalt rock outcrop and cindercones, on protrusions throughout the unit. Included areas make up approximately 20 percent of the map unit area.

153 - Risue - Berent families association, 2 to 15 percent slopes

Elevation: 6,800 to 7,300 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Risue family

65 percent

Lava flows

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*);
Rabbitbrush (*Chrysothamnus* spp.)

Berent family

25 percent

Depressions

2 to 5 percent

Big Sagebrush (*Artemisia tridentata*); Antelope
Bitterbrush (*Purshia tridentata*)

Soil Profile Description

Surface Layer

0 to 6 inches; pale brown cobbly loamy sand & loamy sand; weak very fine granular & weak fine & medium subangular blocky structure; neutral

0 to 13 inches; pale brown & brown loamy sand & gravelly medium sand; weak fine subangular blocky structure & massive; moderately alkaline

Subsoil

6 to 16 inches; yellowish brown, brown sandy clay loam & clay; strong very fine, fine, medium & coarse subangular blocky structure; neutral

—

Substratum

16 inches; strong brown silica-cemented hardpan

13 to 60 inches; pale brown & light yellowish brown loamy fine sand, medium sand & gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

16 inches DP

Greater than 60 inches

Effective Rooting Depth (inches)

16 inches

20 to 40 inches

Available Water Capacity

Very low (1.6 to 2.0 inches)

Low to moderate (3.8 to 5.0 inches)

Water Retention Class

2 (1.6 to 2.0 inches)

2 to 3 (1.1 to 1.6 inches)

Hydrologic Soil Group

D

A

Permeability (in./hr.)

Less than 0.06

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Medium

Slow

Max Erosion Hazard

Moderate

High

Erosion Factor (k)

Surface

0.10 (low)

0.15 (low)

Subsurface

0.15 (low)

0.10 (low)

T Value

1

4

Wind Erodability Group

8

2

153 - Risue - Berent families association (continued)

Soil Manageability
Group
Class

II
2edp

II
3Ep

Range Interpretations

Productivity (lb/acre)

500 to 700

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 65% shallow soils; high erosion hazard

Plant competition; 65% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Percs slowly

Moderate: Too sandy

Picnic Areas

2-8% slopes:
Moderate - small stones; too sandy
8-15% slopes:
Moderate - slope; small stones; too sandy

Severe: Too sandy

Paths & Trails

Moderate: Large stones; too sandy

Moderate: Too sandy

Engineering Interpretations

Unified Class

Surface

SM

SM; SW-SM

Subsoil

ML

—

Substratum

SC

SM; SW-SM

AASHTO Class

Surface

A-2-4

A-2-4

Subsoil

A-7-6

—

Substratum

A-4

A-2-4

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Unsuited

Unsuited

Topsoil

Poor: area reclaim

Fair: Too sandy

Roadfill

Poor: Low strength; area reclaim

Good

Included Areas & Remarks

Included in this map unit are small areas of the Midas family, 5 to 15 percent slopes, on lava flows. Included areas make up approximately 10 percent of the map unit area.

154 - Rock outcrop - Rubbleland complex

Elevation:

Annual Precipitation:

Soil Map Unit
Components

Rock outcrop

Rubbleland

Approx Proportion

—

—

Landscape Position

—

—

Slope

—

—

Typical Vegetation

—

—

Soil Profile Description

Surface Layer

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Rubbleland consists of areas of detached rock fragments (colluvium) which have accumulated on steep to very steep mountainsides as talus. These areas support little or no vegetation and are subject to landslides.

Subsoil

—

—

Substratum

—

—

Soil Properties

Restrictive Layer Depth

—

—

Effective Rooting
Depth (inches)

—

—

Available Water
Capacity

—

—

Water Retention Class

—

—

Hydrologic Soil Group

—

—

Permeability (in./hr.)

—

—

Drainage Class

—

—

Runoff

—

—

Max Erosion Hazard

—

—

Erosion Factor (k)

Surface

—

—

Subsurface

—

—

T Value

—

—

Wind Erodability
Group

—

—

154 - Rock outcrop - Rubbleland complex (continued)

Soil Manageability
Group
Class

—
—

—
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

—
—
—

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

—
—
—

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum
Suitability for
Sand
Gravel
Topsoil
Roadfill

—
—
—

—
—
—

—
—
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—

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—
—
—

Included Areas & Remarks

Note: This unit is basically all misc. landtypes (rock outcrop and rubbleland), and this has few inclusions.

155 - Rock outcrop, limestone - Hymas family association, 60 to 80 percent slopes

Elevation: 5,280 to 8,800 feet Annual Precipitation: 10 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Rock outcrop, limestone

40 percent
Mountainsides and ridgetops

Hymas family

30 percent
Concave mountainsides
60 to 80 percent
Singleleaf Pinyon Pine (*Pinus monophylla*);
Juniper (*Juniperus* spp.)

Soil Profile Description

Surface Layer

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

0 to 6 inches; brown gravelly sandy loam; weak fine granular structure; slightly to strongly effervescent; moderately alkaline

Subsoil

Substratum

—

—

—

6 to 19 inches; yellowish brown very gravelly sandy loam; moderate fine subangular blocky structure; violently effervescent; moderately alkaline

19 inches; hard fractured dolomite bedrock

Soil Properties

Restrictive Layer Depth

—

4 to 20 inches FB

Effective Rooting Depth (inches)

—

4 to 20 inches

Available Water Capacity

—

Very low (0.3 to 1.7 inches)

Water Retention Class

—

2 to 3 (0.3 to 1.7 inches)

Hydrologic Soil Group

—

D

Permeability (in./hr.)

—

2.0 to 6.0

Drainage Class

—

Well drained

Runoff

—

Very Rapid

Max Erosion Hazard

—

High

Erosion Factor (k)

Surface

—

0.10 (low)

Subsurface

—

0.10 (low)

T Value

—

1

Wind Erodability Group

—

8

155 - Rock outcrop (continued)

IV
—IV
4DEGPX

Range Interpretations

Productivity (lb/acre)	—	400 to 600
Suitability	—	Summer - Autumn
Most Limiting Factors	—	Plant competition; 30% shallow soils; 40% rock outcrop; high erosion hazard; very steep slopes

Recreation Interpretations - Limitations for

Camp Areas	—	Severe: Slope
Picnic Areas	—	Severe: Slope
Paths & Trails	—	Severe: Slope

Engineering Interpretations

Unified Class		
Surface	—	SM-SC
Subsoil	—	—
Substratum	—	SW-SM; SM-SC
AASHTO Class		
Surface	—	A-1-b; A-2-4
Subsoil	—	—
Substratum	—	A-1-a; A-1-b; A-2-4
Suitability for		
Sand	—	Poor: Excess fines; thin layer
Gravel	—	Unsuited
Topsoil	—	Poor: Slope; small stones; area reclaim
Roadfill	—	Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Hymas family, 15 to 30 percent slopes, on ridgetops; the Bartine family, 80 to 90 percent slopes, on northerly-facing mountainsides, at higher elevations; and a soil similar to the Beveridge family, but moister, 15 to 60 percent slopes, in canyon bottoms. Included areas make up approximately 30 percent of the map unit area.

Rock outcrop is dolomite.

156 - Rock outcrop, granitic - Brad - Hartig families complex, 30 to 60 percent slopes

Elevation: 7,200 to 11,125 feet Annual Precipitation: 9 to 11 inches

Soil Map Unit Components	Rock outcrop, granitic	Brad family	Hartig family
Approx Proportion	35 percent	15 percent	15 percent
Landscape Position	Mountainsides and ridges	Mountainsides, between rock outcroppings	Mountainsides
Slope	—	30 to 60 percent	30 to 60 percent
Typical Vegetation	—	Mountain Mahogany (Cercocarpus ledifolius); Singleleaf Pinyon Pine (Pinus monophylla)	Big Sagebrush (Artemisia tridentata); Common Pricklygilia (leptodactylon pungens)

Soil Profile Description

Surface Layer	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants	0 to 3 inches; dark grayish brown very gravelly sand; weak medium granular structure; neutral	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline
Subsoil	—	—	—
Substratum	—	3 to 6 inches; dark grayish brown very gravelly loamy sand; massive; neutral 6 inches; hard adamellite bedrock	11 to 33 inches; brown extremely stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock

Soil Properties

Restrictive Layer Depth	—	4 to 8 inches HB	24 to 60 inches FB
Effective Rooting Depth (inches)	—	4 to 8 inches	20 to 40 inches
Available Water Capacity	—	Very low (0.1 to 0.3 inches)	Very low to moderate (1.5 to 4.8 inches)
Water Retention Class	—	3 (0.1 to 0.3 inches)	2 (1.5 to 2.0 inches)
Hydrologic Soil Group	—	D	B
Permeability (in./hr.)	—	6.0 to 20.0	0.6 to 2.0
Drainage Class	—	Excessive	Well drained
Runoff	—	Rapid to Very Rapid	Rapid to Very Rapid
Max Erosion Hazard	—	Very High	Moderate to High
Erosion Factor (k)			
Surface	—	0.02 (low)	0.24 (moderate)
Subsurface	—	0.05 (low)	0.17 (low)
T Value	—	1	3
Wind Erodability Group	—	8	8

156 - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
—

IV
4DEPXg

IV
3Xegp

Range Interpretations

Productivity (lb/acre)

—

600 to 1000

300 to 400

Suitability

—

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 15% shallow soils; 35% rock outcrop; very high erosion hazard; steep slopes

Plant competition; 15% shallow soils; 35% rock outcrop; very high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

—

Severe: Slope; depth to rock; small stones

Severe: Slope

Picnic Areas

—

Severe: Slope; too sandy; large & small stones

Severe: Slope

Paths & Trails

—

Severe: Slope; large & small stones

Severe: Slope

Engineering Interpretations

Unified Class

Surface

—

GW-GM

SM

Subsoil

—

—

—

Substratum

—

GW-GM

GM

AASHTO Class

Surface

—

A-1-a; A-1-b; A-2-4

A-4

Subsoil

—

—

—

Substratum

—

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

—

Unsuited

Unsuited

Gravel

—

Poor: Thin layer

Poor: Slope; thin layer; excess fines

Topsoil

—

Poor: Slope; area reclaim; thin layer; small stones

Poor: Slope; small stones

Roadfill

—

Poor: Slope; area reclaim

Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of Brad family, 60 to 80 percent slopes, on mountainsides, between rock outcroppings; the Hartig family, 60 to 80 percent slopes, on mountainsides; the Sumine family, on mountainsides; the Supervisor family on mid to upper mountainsides and northerly and easterly-facing mountainsides; and a soil similar to the Wrango family, but cooler and less than 20 inches to soft bedrock, on mountainsides. Included areas make up approximately 35 percent of the map unit area.

157 - Rock outcrop, granitic - Brad - Hartig families complex, 60 to 80 percent slopes

Elevation: 5,600 to 10,250 feet Annual Precipitation: 9 to 11 inches

Soil Map Unit Components	Rock outcrop, granitic	Brad family	Hartig family
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Mountainsides	Mountainsides, between rock outcroppings	Mountainsides
Slope	—	60 to 80 percent	60 to 80 percent
Typical Vegetation	—	Mountain Mahogany (Cercocarpus ledifolius); Singleleaf Pinyon Pine (Pinus monophylla)	Big Sagebrush (Artemisia tridentata); Common Pricklygilia (leptodactylon pungens)

Soil Profile Description

Surface Layer	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants	0 to 3 inches; dark grayish brown very gravelly sand; weak medium granular structure; neutral	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline
Subsoil	—	—	—
Substratum	—	3 to 6 inches; dark grayish brown very gravelly loamy sand; massive; neutral 6 inches; hard adamellite bedrock	11 to 33 inches; brown extremely stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock

Soil Properties

Restrictive Layer Depth	—	4 to 8 inches HB	24 to 60 inches FB
Effective Rooting Depth (inches)	—	4 to 8 inches	20 to 40 inches
Available Water Capacity	—	Very low (0.1 to 0.3 inches)	Very low to moderate (1.5 to 4.8 inches)
Water Retention Class	—	3 (0.1 to 0.3 inches)	2 (1.5 to 2.0 inches)
Hydrologic Soil Group	—	D	B
Permeability (in./hr.)	—	6.0 to 20.0	0.6 to 2.0
Drainage Class	—	Excessive	Well drained
Runoff	—	Very Rapid	Very Rapid
Max Erosion Hazard	—	Very High	High
Erosion Factor (k)			
Surface	—	0.02 (low)	0.24 (moderate)
Subsurface	—	0.05 (low)	0.17 (low)
T Value	—	1	3
Wind Erodability Group	—	8	8

157 - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
—

IV
4DEGPX

IV
4EGXp

Range Interpretations

Productivity (lb/acre)

—

600 to 1000

300 to 400

Suitability

—

Summer - Autumn

Summer - Autumn

Most Limiting Factors

—

Plant competition; 20% shallow soils; 35% rock outcrop; very high erosion hazard; very steep slopes

Plant competition; 20% shallow soils; 35% rock outcrop; very high erosion hazard; very steep slopes

Recreation Interpretations - Limitations for

Camp Areas

—

Severe: Slope; depth to rock small stones

Severe: Slope

Picnic Areas

—

Severe: Slope; too sandy; large & small stones

Severe: Slope

Paths & Trails

—

Severe: Slope; large & small stones

Severe: Slope

Engineering Interpretations

Unified Class

—

GW-GM

SM

Surface

—

—

—

Subsoil

Substratum

—

GW-GM

GM

AASHTO Class

Surface

—

A-1-a; A-1-b; A-2-4

A-4

Subsoil

—

—

—

Substratum

—

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

Suitability for

Sand

—

Unsuited

Unsuited

Gravel

—

Poor: Thin layer

Poor: Slope; thin layer; excess fines

Topsoil

—

Poor: Slope; area reclaim; thin layer; small stones

Poor: Slope; small stones

Roadfill

—

Poor: Slope; area reclaim

Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Supervisor family, on mid to upper northerly and easterly-facing mountainsides, at higher elevations; the Sumine family, on mountainsides; and a soil similar to the Wrango family, but cooler and less than 20 inches to soft bedrock, 30 to 60 percent slopes, on mountainsides. Included areas make up approximately 30 percent of the map unit area.

158 - Rock outcrop, granitic - Packham family - Rubbleland association, 30 to 80 percent slopes

Elevation: 6,000 to 12,700 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Rock outcrop, granitic	Packham family	Rubbleland, granitic
Approx Proportion	30 percent	25 percent	20 percent
Landscape Position	Mid to upper mountainsides	Lower mountainsides at higher elevations, and northerly and easterly-facing mountainsides at lower elevations	Mountainsides
Slope	—	30 to 80 percent	—
Typical Vegetation	—	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Wheatgrass (<i>Agropyron</i> spp.)	—

Soil Profile Description

Surface Layer	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants	0 to 3 inches; pale brown extremely cobbly sandy loam; moderate very thick platy structure; neutral	Rubbleland consists of areas of detached rock fragments (colluvium) which have accumulated on steep to very steep mountainsides as talus. These areas support little or no vegetation and are subject to landslides.
Subsoil	—	3 to 15 inches; yellowish brown very & extremely gravelly sandy clay loam; massive; neutral	—
Substratum	—	15 to 60+ inches; light yellowish brown & very pale brown gravelly & extremely gravelly sandy loam; massive; none to violently effervescent; neutral to moderately alkaline	—

Soil Properties

Restrictive Layer Depth	—	30 to 60 inches FB	—
Effective Rooting Depth (inches)	—	20 to 50 inches	—
Available Water Capacity	—	Very low to low (1.3 to 3.3 inches)	—
Water Retention Class	—	2 to 3 (1.0 to 1.2 inches)	—
Hydrologic Soil Group	—	B	—
Permeability (in./hr.)	—	0.2 to 0.6	—
Drainage Class	—	Well drained	—
Runoff	—	Rapid to Very Rapid	—
Max Erosion Hazard	—	Moderate to High	—
Erosion Factor (k)			
Surface	—	0.05 (low)	—
Subsurface	—	0.05 (low)	—
T Value	—	3	—
Wind Erodability Group	—	8	—

158 - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
—

IV
4EGPX

IV
—

Range Interpretations

Productivity (lb/acre)

—

500 to 700

—

Suitability

—

Summer - Autumn

—

Most Limiting Factors

—

Plant competition; 30% rock outcrop; 20% rubbleland; high erosion hazard; very steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

—

Severe: Slope

—

Picnic Areas

—

Severe: Slope

—

Paths & Trails

—

Severe: Slope; large stones

—

Engineering Interpretations

Unified Class

Surface

—

GM; GW-GM

—

Subsoil

—

GM; GW-GM

—

Substratum

—

GM; GW-GM

—

AASHTO Class

Surface

—

A-1-a; A-1-b; A-2-4

—

Subsoil

—

A-2-6

—

Substratum

—

A-1-a; A-1-b; A-2-4

—

Suitability for

Sand

—

Unsuited

—

Gravel

—

Poor: Excess fines

—

Topsoil

—

Poor: Slope; small stones

—

Roadfill

—

Poor: Slope

—

Included Areas & Remarks

Included in this map unit are small areas of the Slinger family, 30 to 60 percent slopes, on southerly and westerly-facing mountainsides, at lower elevations; a soil similar to the Soakpak family, but warmer, on upper mountainsides and ridges, at higher elevations. Included areas make up approximately 25 percent of the map unit area.

159 - Sanpete - Theriot families complex, 5 to 60 percent slopes

Elevation: 4,240 to 9,200 feet Annual Precipitation: 7 to 9 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Sanpete family

35 percent

Mid to lower mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Juniper (*Juniperus* spp.); Black sagebrush (*Artemisia arbuscula nova*)

Theriot family

35 percent

Ridges and upper to mid mountainsides

15 to 30 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 2 inches; pale brown gravelly fine sandy loam; weak fine granular structure; violently effervescent; moderately alkaline

0 to 6 inches; pale brown & light yellowish brown gravelly sandy loam & very cobbly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

2 to 21 inches; light yellowish brown very cobbly fine sandy loam; weak fine subangular blocky structure; violently effervescent; moderately alkaline

—

Substratum

21 to 24 inches; white very cobbly fine sandy loam; massive; violently effervescent; moderately alkaline

6 inches; hard limestone bedrock

24 inches; hard calcareous metasedimentary bedrock

Soil Properties

Restrictive Layer Depth

21 to 40 inches HB

6 to 18 inches HB

Effective Rooting Depth (inches)

21 to 40 inches

6 to 18 inches

Available Water Capacity

Very low to low (1.5 to 3.4 inches)

Very low (0.4 to 1.4 inches)

Water Retention Class

2 (1.5 to 1.7 inches)

2 to 3 (0.4 to 1.4 inches)

Hydrologic Soil Group

C

D

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid

Max Erosion Hazard

Moderate to High

Moderate

Erosion Factor (k)

Surface

0.15 (low)

0.10 (low)

Subsurface

0.15 (low)

0.05 (low)

T Value

2

1

Wind Erodability Group

8

8

159 - Sanpete - Theriot families complex (continued)

Soil Manageability
Group
Class

IV
2egpx

IV
4DPex

Range Interpretations

Productivity (lb/acre)

300 to 500

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; depth to rock

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe: Slope

Engineering Interpretations

Unified Class

Surface

SM

GW-GM; GM-GC

Subsoil

SM-SC

—

Substratum

GM; GW-GM

—

AASHTO Class

Surface

A-4

A-1-a; A-1-b; A-2-4

Subsoil

A-2-4; A-4

—

Substratum

A-1-a; A-1-b; A-2-4

—

Suitability for

Sand

Unsuited

Unsuited

Gravel

Poor: Thin layer

Poor: Excess fines; thin layer

Topsoil

Poor: Slope; large & small stones

Poor: Slope; small stones; area reclaim

Roadfill

Poor: Slope; area reclaim

15 to 25% slopes:

Poor - area reclaim

25 to 30% slopes:

Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, 5 to 15 percent slopes, in valley floors; the Theriot family, 30 to 60 percent slopes, on mid to lower mountainsides; a soil similar to the Gol family, but warmer and less than 20 inches to a hard calcium layer, 2 to 15 percent slopes, on alluvial fans; and limestone and dolomite rock outcropping, on ridges and mountainsides. Included areas make up approximately 30 percent of the map unit area.

160 - Sanpete - Theriot families - Rock outcrop, limestone association, 60 to 80 percent slopes

Elevation: 4,800 to 8,600 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Sanpete family	Theriot family	Rock outcrop, limestone
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Mid to lower mountainsides	Upper to mid mountainsides	Mountainsides
Slope	60 to 80 percent	60 to 80 percent	—
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Juniper (<i>Juniperus</i> spp.); Black sagebrush (<i>Artemisia arbuscula nova</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 2 inches; pale brown gravelly fine sandy loam; weak fine granular structure; violently effervescent; moderately alkaline	0 to 6 inches; pale brown & light yellowish brown gravelly sandy loam & very cobbly sandy loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	2 to 21 inches; light yellowish brown very cobbly fine sandy loam; weak fine subangular blocky structure; violently effervescent; moderately alkaline	—	—
Substratum	21 to 24 inches; white very cobbly fine sandy loam; massive; violently effervescent; moderately alkaline 24 inches; hard calcareous metasedimentary bedrock	6 inches; hard limestone bedrock	—

Soil Properties

Restrictive Layer Depth	21 to 40 inches HB	6 to 18 inches HB	—
Effective Rooting Depth (inches)	21 to 40 inches	6 to 18 inches	—
Available Water Capacity	Very low to low (1.5 to 3.4 inches)	Very low (0.4 to 1.4 inches)	—
Water Retention Class	2 (1.5 to 1.7 inches)	2 to 3 (0.4 to 1.4 inches)	—
Hydrologic Soil Group	C	D	—
Permeability (in./hr.)	2.0 to 6.0	2.0 to 6.0	—
Drainage Class	Well drained	Well drained	—
Runoff	Very Rapid	Very Rapid	—
Max Erosion Hazard	High	High	—
Erosion Factor (k)			
Surface	0.15 (low)	0.10 (low)	—
Subsurface	0.15 (low)	0.05 (low)	—
T Value	2	1	—
Wind Erodability Group	8	8	—

160 - Sanpete - Theriot families - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EGXp

IV
4DEGPX

IV
—

Range Interpretations

Productivity (lb/acre)

300 to 500

300 to 500

—

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 20% rock outcrop; high erosion hazard; very steep slopes

Plant competition; 20% rock outcrop; high erosion hazard; very steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; depth to rock

—

Picnic Areas

Severe: Slope

Severe: Slope

—

Paths & Trails

Severe: Slope

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

SM

GW-GM; GM-GC

—

Subsoil

SM-SC

—

—

Substratum

GM; GW-GM

—

—

AASHTO Class

Surface

A-4

A-1-a; A-1-b; A-2-4

—

Subsoil

A-2-4; A-4

—

—

Substratum

A-1-a; A-1-b; A-2-4

—

—

Suitability for

Sand

Unsuited

Unsuited

—

Gravel

Poor: Thin layer

Poor: Excess fines; thin layer

—

Topsoil

Poor: Slope; large & small stones

Poor: Slope; small stones; area reclaim

—

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of the Theriot family, 15 to 30 percent slopes, on ridgetops; and the Mulett family, on mid to lower mountainsides. Included areas make up approximately 20 percent of the map unit area.

Rock outcrop is limestone and dolomite.

161 - Simpson - Hartig - Bregar families association, 30 to 60 percent slopes

Elevation: 7,500 to 7,600 feet Annual Precipitation: 9 to 10 inches

Map Unit Components	Simpson family	Hartig family	Bregar family
Approx Proportion	40 percent	20 percent	20 percent
Landscape Position	Southerly and westerly-facing mountainsides	Northerly and easterly-facing mountainsides	Toeslopes and some lower northerly and easterly-facing mountainsides
Slope	30 to 60 percent	30 to 60 percent	30 to 60 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Common Pricklygilia (<i>Leptodactylon pungens</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope bitterbrush (<i>Purshia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 8 inches; pale brown & brown gravelly loamy sand & sandy loam; weak fine & medium subangular blocky structure; neutral to mildly alkaline	0 to 11 inches; brown gravelly loam; moderate very fine & fine subangular blocky structure; mildly alkaline	0 to 2 inches; light brownish gray very cobbly loam; weak medium platy structure; mildly alkaline
Subsoil	8 to 23 inches; light yellowish brown & reddish yellow clay loam & cobbly clay loam; moderate fine prismatic & fine, medium & coarse subangular blocky structure; strongly effervescent; moderately alkaline	—	2 to 15 inches; light yellowish brown extremely cobbly & extremely gravelly loam; massive; neutral to mildly alkaline
Substratum	23 inches; andesite bedrock	11 to 33 inches; brown extremely stony fine sandy loam; moderate very fine & fine subangular blocky structure; violently effervescent; mildly alkaline 33 inches; hard fractured granitic bedrock	15 inches; hard fractured silty shale bedrock

Soil Properties

Restrictive Layer Depth	20 to 40 inches HB	24 to 60 inches FB	15 to 20 inches FB
Eff. Rooting Depth	20 to 40 inches	20 to 40 inches	15 to 20 inches
Available Water Capacity	Low to moderate (2.3 to 5.8 inches)	Very low to moderate (1.5 to 4.8 inches)	Very low (0.6 to 1.1 inches)
Water Retention Class	1 to 2 (2.3 to 2.9 inches)	2 (1.5 to 2.0 inches)	3 (0.6 to 1.1 inches)
Hydrologic Soil Group	C	B	D
Permeability (in./hr.)	0.2 to 0.6	0.6 to 2.0	0.6 to 2.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	Rapid to Very Rapid
Max Erosion Hazard	High	Moderate to High	High
Erosion Factor (k)			
Surface	0.05 (low)	0.24 (moderate)	0.10 (low)
Subsurface	0.15 (low)	0.17 (low)	0.05 (low)
T Value	2	3	1
Wind Erodability Group	8	8	8

161 - Simpson - Hartig - Bregar families association (continued)

Soil Manageability Group Class	III 3Egx	III 2egpx	III 4EPdgx
Range Interpretations			
Productivity (lb/acre)	400 to 600	300 to 400	300 to 500
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 5% rubbleland; high erosion hazard; steep slopes	Plant competition; 5% rubbleland; high erosion hazard; steep slopes	Plant competition; 5% rubbleland; high erosion hazard; steep slopes
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope	Severe: Slope	Severe: Slope
Picnic Areas	Severe: Slope	Severe: Slope	Severe: Slope
Paths & Trails	Severe: Slope	Severe: Slope	Severe: Slope
Engineering Interpretations			
Unified Class	SM	SM	GC
Surface	ML	—	GC; GW-GM
Subsoil	—	GM	—
Substratum	—	—	—
AASHTO Class	A-1-b; A-2-4	A-4	A-2-4
Surface	A-7-6	—	A-2-4
Subsoil	—	A-1-a; A-1-b; A-2-4	—
Substratum	—	—	—
Suitability for Sand	Unsuited	Unsuited	Unsuited
Gravel	Unsuited	Poor: Slope; thin layer; excess fines	Unsuited
Topsoil	Poor: Slope	Poor: Slope; small stones	Poor: Slope; area reclaim; small stones
Roadfill	Poor: Slope; area reclaim	Poor: Slope; area reclaim	Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of Typic Haplargids, on northerly and easterly-facing mountainsides; the Washoe family, on southerly and westerly-facing mountainsides; and rubbleland, on mountainsides, but particularly associated with the Hartig family. Included areas make up approximately 20 percent of the map unit area.

162 - Spanel - Trocken families complex, 2 to 15 percent slopes

Elevation: 4,650 to 6,750 feet Annual Precipitation: 6 to 7 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Spanel family

50 percent

Alluvial terraces & dissected alluvial fans

2 to 15 percent

Shadscale (*Artiplex confertifolia*); Mormon Tea (*Ephedra* spp.)

Trocken family

20 percent

Recent drainages

2 to 15 percent

Big Sagebrush (*Artemisia tridentata*); Greenfire (*Menodora* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; pale brown gravelly loam & loam; moderate very thin & thin platy & weak medium subangular blocky structure; slightly effervescent; moderately alkaline

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

3 to 19 inches; pale brown & light yellowish brown loam; moderate medium subangular blocky structure; slightly effervescent; moderately alkaline

—

Substratum

19 to 60 inches; indurated pan; light gray; violently effervescent; moderately alkaline

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

8 to 19 inches DP

24 to 60+ inches HB

Effective Rooting Depth (inches)

8 to 19 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.0 to 3.1 inches)

Very low to low (1.3 to 4.0 inches)

Water Retention Class

1 to 3 (1.0 to 3.1 inches)

2 to 3 (1.1 to 1.4 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

Less than 0.06

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Slow to Medium

Slow to Medium

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.24 (moderate)

0.10 (low)

Subsurface

0.43 (high)

0.05 (low)

T Value

1

3

Wind Erodability Group

4L

8

162 - Spanel - Trocken families complex (continued)

Soil Manageability
Group
Class

III
3Edp

III
3Ep

Range Interpretations

Productivity (lb/acre)

100 to 300

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 50% shallow soils; high erosion hazard

Plant competition; 50% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: percs slowly

2-8% slopes:

Moderate - small stones

8-15% slopes:

Moderate - slope; small stones

Picnic Areas

2-8% slopes:

Slight

2-8% slopes:

Moderate - small stones

8-15% slopes:

Moderate - slope

8-15% slopes:

Moderate - slope; small stones

Paths & Trails

Slight

Moderate: Small stones

Engineering Interpretations

Unified Class

Surface

ML-CL

SM

Subsoil

CL

—

Substratum

—

GW-GM; GM-GC

AASHTO Class

Surface

A-4

A-1-b; A-2-4

Subsoil

A-4

—

Substratum

—

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope; area reclaim

Poor: Small stones

Roadfill

Poor: Low strength

Good

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Spanel soil, but with a more fractured hardpan, on alluvial terraces and dissected alluvial fans; a soil similar to the Midas family, but less than 20 inches to a calcium-silica cemented layer, 15 to 30 percent slopes, on sideslopes and shoulders of older alluvial fans; the Bluewing family, in recent drainages; a soil similar to the Midas family, but less than 20 inches to hardpan, on alluvial terraces; and a soil similar to the Midas family, but with a more developed subsoil, on ridgetops and shoulders of ridges. Included areas make up approximately 30 percent of the map unit area.

163 - Spanel - Trocken families complex, 15 to 30 percent slopes

Elevation: 5,700 to 7,600 feet Annual Precipitation: 6 to 7 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Spanel family

50 percent

Dissected older alluvial fans

15 to 30 percent

Shadscale (*Artiplex confertifolia*); Mormon Tea (*Ephedra* spp.)

Trocken family

20 percent

Recent drainages

15 to 30 percent

Big Sagebrush (*Artemisia tridentata*); Greenfire (*Menodora* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; pale brown gravelly loam & loam; moderate very thin & thin platy & weak medium subangular blocky structure; slightly effervescent; moderately alkaline

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

3 to 19 inches; pale brown & light yellowish brown loam; moderate medium subangular blocky structure; slightly effervescent; moderately alkaline

—

Substratum

19 to 60 inches; indurated pan; light gray; violently effervescent; moderately alkaline

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

8 to 19 inches DP

24 to 60+ inches HB

Effective Rooting Depth (inches)

8 to 19 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.0 to 3.1 inches)

Very low to low (1.3 to 4.0 inches)

Water Retention Class

1 to 3 (1.0 to 3.1 inches)

2 to 3 (1.1 to 1.4 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

Less than 0.06

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Rapid

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.24 (moderate)

0.10 (low)

Subsurface

0.43 (high)

0.05 (low)

T Value

1

3

Wind Erodability Group

4L

8

163 - Spanel - Trocken families complex (continued)

Soil Manageability
Group
Class

III
3Edp

III
3Ep

Range Interpretations

Productivity (lb/acre)

100 to 300

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 50% shallow soils; high erosion hazard

Plant competition; 50% shallow soils; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; percs slowly

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope
25-30% slopes:
Severe: Slope

15-25% slopes:
Moderate slope; small stones
25-30% slopes:
Severe: Slope

Engineering Interpretations

Unified Class

Surface

ML-CL

SM

Subsoil

CL

Substratum

—

GW-GM; GM-GC

AASHTO Class

Surface

A-4

A-1-b; A-2-4

Subsoil

A-4

—

Substratum

—

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope; area reclaim

Poor: Slope; small stones

Roadfill

15 to 25% slopes:
Poor - low strength
25 to 30% slopes:
Poor - slope; low strength

15 to 25% slopes:
Fair - slope
25 to 30% slopes:
Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Spanel family, but with a more fractured hardpan, on dissected older alluvial fans; a soil similar to the Midas family, but Less than 20 inches to a calcium-silica cemented layer, on sideslopes and shoulders of older alluvial fans; the Finley family, on colluvial sideslopes; a soil similar to the Midas family, but with a more developed subsoil, 2 to 15 percent slopes, on shoulders of ridges and ridgetops; and the Bluewing family, 2 to 15 percent slopes, in recent drainages. Included areas make up approximately 30 percent of the map unit area.

164 - Spanel - Trocken families complex, 30 to 60 percent slopes

Elevation: 4,160 to 6,600 feet Annual Precipitation: 6 to 7 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Spanel family

45 percent

Dissected old alluvial fans

30 to 60 percent

Shadscale (*Artiplex confertifolia*); Mormon Tea (*Ephedra* spp.)

Trocken family

20 percent

Recent drainages

30 to 60 percent

Big Sagebrush (*Artemisia tridentata*); Greenfire (*Mendora* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; pale brown gravelly loam & loam; moderate very thin & thin platy & weak medium subangular blocky structure; slightly effervescent; moderately alkaline

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

Subsoil

3 to 19 inches; pale brown & light yellowish brown loam; moderate medium subangular blocky structure; slightly effervescent; moderately alkaline

—

Substratum

19 to 60 inches; indurated pan; light gray; violently effervescent; moderately alkaline

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

8 to 19 inches DP

24 to 60 inches HB

Effective Rooting Depth (inches)

8 to 19 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.0 to 3.1 inches)

Very low to low (1.3 to 4.0 inches)

Water Retention Class

1 to 3 (1.0 to 3.1 inches)

2 to 3 (1.1 to 1.4 inches)

Hydrologic Soil Group

D

B

Permeability (in./hr.)

Less than 0.06

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Max Erosion Hazard

Very High

High to Very High

Erosion Factor (k)

Surface

0.24 (moderate)

0.10 (low)

Subsurface

0.43 (high)

0.05 (low)

T Value

1

3

Wind Erodability Group

4L

8

164 - Spanel - Trocken families complex (continued)

Soil Manageability Group Class

III
3Edgp

III
3Egp

Range Interpretations

Productivity (lb/acre)

100 to 300

300 to 400

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 45% shallow soils; very high erosion hazard; steep slopes

Plant competition; 45% shallow soils; very high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; percs slowly

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope

Engineering Interpretations

Unified Class

Surface

ML-CL

SM

Subsoil

CL

—

Substratum

—

GW-GM; GM-GC

AASHTO Class

Surface

A-4

A-1-b; A-2-4

Subsoil

A-4

—

Substratum

—

A-1-a; A-1-b; A-2-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Poor: Excess fines

Topsoil

Poor: Slope; area reclaim

Poor: Slope; small stones

Roadfill

Poor: Slope; low strength

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Berent family, but drier, on mountainsides; a soil similar to the Spanel family, but with a more fractured hardpan, on dissected older alluvial fans; the Bluewing family, in recent drainages; the Finley family, 30 to 80 percent slopes, on colluvial sideslopes; a soil similar to the Midas family, but Less than 20 inches to a calcium-silica cemented layer, on sideslopes and shoulders of fans; and a soil similar to the Midas family, but with a more developed subsoil, 15 to 30 percent slopes, on shoulders of ridges and on ridgetops. Included areas make up approximately 35 percent of the map unit area.

165 - St. Marys - Bearskin families - Rock outcrop, volcanic association, 15 to 60 percent slopes

Elevation: 7,480 to 8,200 feet Annual Precipitation: 11 to 12 inches

Soil Map Unit Components	St. Marys family	Bearskin family	Rock outcrop, volcanic
Approx Proportion	40 percent	25 percent	15 percent
Landscape Position	Mountainsides	Ridgetops and shoulders of upper mountainsides.	Ridges and mountainsides
Slope	30 to 60 percent	15 to 30 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Buckwheat (<i>Eriogonum</i> spp.)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>); Antelope Bitterbrush (<i>Purshia tridentata</i>)	—

Soil Profile Description

Surface Layer	0 to 9 inches; grayish brown & brown extremely stony loamy sand & loam; weak very fine, fine & medium subangular blocky structure; neutral	1 to 0 inches; Litter 0 to 2 inches; brown very cobbly sandy loam; weak very fine & fine subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	9 to 26 inches; brown & yellowish brown very gravelly clay loam & loam; massive; neutral	2 to 17 inches; brown cobbly sandy clay loam & sandy clay loam; moderate medium & coarse, & strong coarse subangular blocky structure; neutral	—
Substratum	26 to 60 inches; yellowish brown extremely gravelly loam & loam; massive; neutral	17 inches; hard basalt bedrock	—

Soil Properties

Restrictive Layer Depth	Greater than 60 inches	13 to 20 inches HB	—
Effective Rooting Depth (inches)	20 to 40 inches	13 to 20 inches	—
Available Water Capacity	Moderate (5.5 to 7.0 inches)	Very low to low (1.6 to 3.2 inches)	—
Water Retention Class	2 (1.2 to 1.6 inches)	1 to 2 (1.6 to 3.2 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid to Very Rapid	Rapid	—
Max Erosion Hazard	Moderate to High	Moderate to High	—
Erosion Factor (k)			
Surface	0.02 (low)	0.02 (low)	—
Subsurface	0.05 (low)	0.10 (low)	—
T Value	2	1	—
Wind Erodability Group	8	8	—

165 - St. Marys - Bearskin families - Rock outcrop (continued)

Soil Manageability Group Class

IV
4EXgp

IV
3Xedp

IV
—

Range Interpretations

Productivity (lb/acre) Suitability Most Limiting Factors

600 to 1000

400 to 600

—

Summer - Autumn

Summer - Autumn

—

Plant competition; 25% shallow
soils; 15% rock outcrop; high
erosion hazard; steep slopes

Plant competition; 25%
shallow soils; 15% rock
outcrop; high erosion hazard;
steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope; large &
small stones

Severe: Slope

—

Picnic Areas

Severe: Slope; large &
small stones

Severe: Slope

—

Paths & Trails

Severe: Slope; large &
small stones

15-25% slopes:
Severe - large stones
25-30% slopes:
Severe - slope;
large stones

—

Engineering Interpretations

Unified Class Surface Subsoil Substratum

GW-GM
GC
SM

SC
SM
—

—
—
—

AASHTO Class Surface Subsoil Substratum

A-1-a; A-1-b; A-2-4
A-2-6
A-4

A-2-4
A-6
—

—
—
—

Suitability for Sand Gravel Topsoil Roadfill

Poor: Excess fines
Unsuited
Poor: Slope; small stones
Poor: Slope

Poor: Excess fines
Unsuited
Poor: Slope
15-25% slopes:
Poor - are reclaim
25-30% slopes:
Poor - slope; area reclaim

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Preston family, but colder, 15 to 30 percent slopes, in valleys and depressions; the Wenzel family, 30 to 60 percent slopes, on mid to upper mountainsides and rubbleland, on mountainsides. Included areas make up approximately 20 percent of the map unit area.

Rock outcrop is basalt.

166 - Supervisor - Bartine families association, 30 to 70 percent slopes

Elevation: 8,450 to 11,360 feet Annual Precipitation: 11 to 17 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Supervisor family

50 percent

Lower to mid mountainsides

30 to 50 percent

Big Sagebrush (*Artemesia tridentata*); Lupine (*Lupinus* spp.)

Bartine family

30 percent

Mid to upper mountainsides

50 to 70 percent

Bristlecone Pine (*Pinus aristata*); Limber Pine (*Pinus flexilis*).

Soil Profile Description

Surface Layer

0 to 13 inches; grayish brown gravelly & very gravelly loam; weak very fine, fine & medium subangular blocky structure; neutral

0 to 11 inches; dark grayish brown & brown cobbly & very cobbly sandy loam; weak fine & medium subangular blocky structure; slightly effervescent; mildly alkaline

Subsoil

—

11 to 42 inches; pale brown very cobbly & extremely cobbly loam; weak fine & medium subangular blocky structure; slightly to violently effervescent; mildly to moderately alkaline

Substratum

13 to 60 inches; very pale brown extremely gravelly & extremely cobbly clay loam; massive; neutral

42 inches; hard, fractured dolomite bedrock

Soil Properties

Restrictive Layer Depth

30 to 60 inches FB

40 to 60 inches FB

Effective Rooting Depth (inches)

20 to 40 inches

40 to 60 inches

Available Water Capacity

Very low to low (1.5 to 3.5 inches)

Low to moderate (2.4 to 4.7 inches)

Water Retention Class

2 (1.5 to 1.9 inches)

2 (1.5 to 2.0 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

0.2 to 0.6

0.6 to 2.0

Drainage Class

Well drained

Well drained

Runoff

Rapid

Very Rapid

Max Erosion Hazard

High

High

Erosion Factor (k)

Surface

0.17 (low)

0.15 (low)

Subsurface

0.15 (low)

0.10 (low)

T Value

4

3

Wind Erodability Group

8

8

166 - Supervisor - Bartine families association (continued)

Soil Manageability
Group
Class

III
3EGpx

III
4EGpx

Range Interpretations

Productivity (lb/acre)

600 to 1000

350 to 650

Suitability

Summer

Summer

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes.

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes.

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SC
—
GW; GM

SM
SM-SC
—

AASHTO Class
Surface
Subsoil
Substratum

A-4
—
A-2-6

A-2-4
A-2-4; A-4
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Fair: Excess fines
Poor: Slope; small stones
Poor: Slope

Unsuited
Unsuited
Poor: Slope; small stones
Poor: slope; large stones

Included Areas & Remarks

Included in map this map unit are small areas of the Swift Creek family, 30 to 50 percent slopes, mountainsides; and dolomite rock outcrop, on mountainsides and ridges. Included areas make up approximately 20 percent of the map unit area.

167 - Supervisor family - Rock outcrop, limestone - Bartine family association, 15 to 60 percent slopes

Elevation: 9,300 to 10,800 feet Annual Precipitation: 11 to 17 inches

Soil Map Unit Components	Supervisor family	Rock outcrop, limestone	Bartine family
Approx Proportion	35 percent	25 percent	20 percent
Landscape Position	Toeslopes and concave positions on mountainsides.	Mountainsides	Mountainsides
Slope	15 to 30 percent	—	30 to 60 percent
Typical Vegetation	Big Sagebrush (<i>Artemesia tridentata</i>); Lupine (<i>Lupinus</i> spp.)	—	Bristlecone Pine (<i>Pinus aristata</i>); Limber Pine (<i>Pinus flexilis</i>)

Soil Profile Description

Surface Layer	0 to 13 inches; grayish brown gravelly & very gravelly loam; weak very fine, fine & medium subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants	0 to 11 inches; dark grayish brown & brown cobbly & very cobbly sandy loam; weak fine & medium subangular blocky structure; slightly effervescent; mildly alkaline
Subsoil	—	—	11 to 42 inches; pale brown very cobbly & extremely cobbly loam; weak fine & medium subangular blocky structure; slightly to violently effervescent; mildly to moderately alkaline
Substratum	13 to 60 inches; very pale brown extremely gravelly & extremely cobbly clay loam; massive; neutral	—	42 inches; hard fractured dolomite bedrock

Soil Properties

Restrictive Layer Depth	30 to 60 inches FB	—	40 to 60 inches FB
Effective Rooting Depth (inches)	20 to 40 inches	—	40 to 60 inches
Available Water Capacity	Very low to low (1.5 to 3.5 inches)	—	Low to moderate (2.4 to 4.7 inches)
Water Retention Class	2 (1.5 to 1.9 inches)	—	2 (1.5 to 2.0 inches)
Hydrologic Soil Group	B	—	B
Permeability (in./hr.)	0.2 to 0.6	—	0.6 to 2.0
Drainage Class	Well drained	—	Well drained
Runoff	Rapid	—	Rapid to Very Rapid
Max Erosion Hazard	Moderate to High	—	Moderate to High
Erosion Factor (k)			
Surface	0.17 (low)	—	0.15 (low)
Subsurface	0.15 (low)	—	0.10 (low)
T Value	4	—	3
Wind Erodability Group	8	—	8

167 - Supervisor family - Rock outcrop (continued)

Soil Manageability
Group
Class

III
3Xep

III
—

III
4EXgp

Range Interpretations

Productivity (lb/acre)

600 to 1000

—

350 to 650

Suitability

Summer

—

Summer

Most Limiting Factors

Plant competition; 25% rock
outcrop; high erosion hazard;
steep slopes

—

Plant competition; 25% rock
outcrop; high erosion hazard;
steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Severe: Slope

Picnic Areas

Severe: Slope

—

Severe: Slope

Paths & Trails

15-25% slopes:
Moderate - slope;
small stones
25-30% slopes:
Severe - Slope

—

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SC

—

SM

Subsoil

—

—

SM-SC

Substratum

GW; GM

—

—

AASHTO Class

Surface

A-4

—

A-2-4

Subsoil

—

—

A-2-4; A-4

Substratum

A-2-6

—

—

Suitability for

Sand

Unsuited

—

Unsuited

Gravel

Fair: Excess fines

—

Unsuited

Topsoil

Poor: Slope; small stones

—

Poor: Slope; small stones

Roadfill

15-25% slopes:
Fair - slope
25-30% slopes:
Poor - slope

—

Poor: Slope; large stones

Included Areas & Remarks

Included in this map unit are small areas of the Hartig family, 30 to 60 percent slopes, on southerly and westerly-facing mountainsides; and the Packham family, 30 to 60 percent slopes, on mountainsides. Included areas make up approximately 20 percent of the map unit area.

Rock outcrop is dolomite.

**168 - Supervisor family - Rock outcrop, granitic - Pergelic Cryoborolls association,
60 to 80 percent slopes**

Elevation: 8,800 to 12,565 feet Annual Precipitation: 15 to 17 inches

**Soil Map Unit
Components**

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Supervisor family

Rock outcrop, granitic

Pergelic Cryoborolls

30 percent

25 percent

20 percent

Southerly and westerly-facing
mountainsides

Mountainsides and ridges

Northerly and easterly-facing
mountainsides

60 to 80 percent

—

60 to 80 percent

Big Sagebrush (*Artemesia
tridentata*); Lupine (*Lupinus
spp.*)

—

Goldenbush (*Haplopappus
spp.*); Buckwheat (*Eriogonum
spp.*); Bluegrass (*Poa spp.*)

Soil Profile Description

Surface Layer

0 to 13 inches; grayish brown
gravelly & very gravelly loam;
weak very fine, fine & medium
subangular blocky structure;
neutral

Rock outcrop consists of
contiguous bare bedrock and
less than 15 percent
inclusions of soil material
capable of supporting plants

1 to 0 inch; Root mat
0 to 2 inches; dark grayish
brown very stony loam;
moderate medium & coarse
subangular blocky structure;
neutral

Subsoil

—

—

2 to 14 inches; brown &
yellowish brown very stony
loam; moderate fine, medium &
coarse subangular blocky
structure; neutral to slightly
acid

Substratum

13 to 60 inches; very pale
brown extremely gravelly &
extremely cobbly clay loam;
massive; neutral

—

14 to 39 inches; pale brown
very stony & extremely stony
loam; moderate fine & medium
subangular blocky structure;
slightly to strongly acid

39 inches; hard fractured
granodiorite bedrock

Soil Properties

Restrictive Layer Depth

30 to 60 inches FB

—

35 to 60+ inches FB

Effective Rooting
Depth (inches)

20 to 40 inches

—

20 to 40 inches

Available Water
Capacity

Very low to low
(1.5 to 3.5 inches)

—

Low (2.0 to 3.5 inches)

Water Retention Class

2 (1.5 to 1.9 inches)

—

2 (1.4 to 1.8 inches)

Hydrologic Soil Group

B

—

B

Permeability (in./hr.)

0.2 to 0.6

—

0.6 to 2.0

Drainage Class

Well drained

—

Well drained

Runoff

Very Rapid

—

Very Rapid

Max Erosion Hazard

High

—

High

Erosion Factor (k)

Surface

0.17 (low)

—

0.17 (low)

Subsurface

0.15 (low)

—

0.10 (low)

T Value

4

—

4

Wind Erodability
Group

8

—

8

168 - Supervisor family - Rock outcrop (continued)

Soil Manageability Group Class

IV
4EGXp

IV
—

IV
4EGXp

Range Interpretations

Productivity (lb/acre)

600 to 1000

—

75 to 100

Suitability

Summer

—

Summer

Most Limiting Factors

Plant competition; 25% rock
outcrop; high erosion hazard;
very steep slopes

—

Plant competition; 25% rock
outcrop; high erosion hazard;
very steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Severe: Slope

Picnic Areas

Severe: Slope

—

Severe: slope

Paths & Trails

Severe: Slope; large stones

—

Severe: Slope; large stones

Engineering Interpretations

Unified Class

Surface

SC

—

SM

Subsoil

—

—

SC

Substratum

GW-GM

—

SM-SC

AASHTO Class

Surface

A-4

—

A-4

Subsoil

—

—

A-2-4

Substratum

A-2-6

—

A-4

Suitability for

Sand

Unsuited

—

Unsuited

Gravel

Fair: Excess fines

—

Unsuited

Topsoil

Poor: Slope; small stones

—

Poor: Slope; large & small
stones

Roadfill

Poor: Slope

—

Poor: Slope; large stones; area
reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Soakpak family, 30 to 60 percent slopes, on benches of mountainsides; and granitic rubbleland, on mountainsides. Included areas make up approximately 25 percent of the map unit area.

169 - Supervisor family - Rock outcrop, metasedimentary complex, 5 to 30 percent slopes

Elevation: 9,900 to 11,050 feet Annual Precipitation: 17 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Supervisor family

65 percent

Mountainsides

5 to 30 percent

Big Sagebrush (*Artemesia tridentata*); Lupine (*Lupinus* spp.)

Rock outcrop, metasedimentary

15 percent

Ridges and upper mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 13 inches; grayish brown gravelly & very gravelly loam; weak very fine, fine & medium subangular blocky structure; neutral

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

13 to 60 inches; very pale brown extremely gravelly & extremely cobbly clay loam; massive; neutral

—

Soil Properties

Restrictive Layer Depth

30 to 60 inches FB

—

Effective Rooting Depth (inches)

20 to 40 inches

—

Available Water Capacity

Very low to low (1.5 to 3.5 inches)

—

Water Retention Class

2 (1.5 to 1.9 inches)

—

Hydrologic Soil Group

B

—

Permeability (in./hr.)

0.20 to 0.60

—

Drainage Class

Well drained

—

Runoff

Medium to Rapid

—

Max Erosion Hazard

Moderate to High

—

Erosion Factor (k)

Surface

0.17 (low)

—

Subsurface

0.15 (low)

—

T Value

4

—

Wind Erodability Group

8

—

169 - Supervisor family - Rock outcrop (continued)

Soil Manageability Group Class

III
3Xep

III
—

Range Interpretations

Productivity (lb/acre)	600 to 1000	—
Suitability	Summer	—
Most Limiting Factors	Plant competition; 15% rock outcrop; high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	5-8% slopes:	—
	Moderate - small stones	
	8-15% slopes:	
Picnic Areas	Moderate - slope; small stones	
	15-30% slopes:	
	Severe - slope	
Paths & Trails	5-8% slopes:	—
	Moderate - small stones	
	8-15% slopes:	
	Moderate - slope; small stones	
	15-30% slopes:	
	Severe - slope	
	5-15% slopes:	—
	Moderate - small stones	
	15-25% slopes:	
	Moderate - slope; small stones	
	25-30% slopes:	
	Severe - slope	

Engineering Interpretations

Unified Class	SC	—
Surface	—	—
Subsoil	—	—
Substratum	GW; GM	—
AASHTO Class		
Surface	A-4	—
Subsoil	—	—
Substratum	A-2-6	—
Suitability for		
Sand	Unsuited	—
Gravel	Fair: Excess fines	—
Topsoil	5-15% slopes:	—
Roadfill	Poor - small stones	
	15-30% slopes:	
	Poor - slope; small stones	
	5-15% slopes:	—
	Good	
	15-25% slopes:	
	Fair - slope	
	25-30% slopes:	
	Poor - slope	

Included Areas & Remarks

Included in this map unit are small areas of the Bartine family, on mountainsides; the Packham family, on smooth-shaped mountainsides; and metasedimentary rubbleland, on mountainsides. Included areas make up approximately 20 percent of the map unit area.

170 - Supervisor family - Rock outcrop, metasedimentary complex, 30 to 60 percent slopes

Elevation: 8,800 to 11,550 feet Annual Precipitation: 17 inches

Soil Map Unit Components	Supervisor family	Rock outcrop, metasedimentary
Approx Proportion	65 percent	15 percent
Landscape Position	Mountainsides	Mountainsides & ridges
Slope	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemesia tridentata</i>); Lupine (<i>Lupinus</i> spp)	—

Soil Profile Description

Surface Layer	0 to 13 inches; grayish brown gravelly & very gravelly loam; weak very fine, fine & medium subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	13 to 60 inches; very pale brown extremely gravelly & extremely cobbly clay loam; massive; neutral	—

Soil Properties

Restrictive Layer Depth	30 to 60 inches FB	—
Effective Rooting Depth (inches)	20 to 40 inches	—
Available Water Capacity	Very low to low (1.5 to 3.5 inches)	—
Water Retention Class	2 (1.5 to 1.9 inches)	—
Hydrologic Soil Group	B	—
Permeability (in./hr.)	0.2 to 0.6	—
Drainage Class	Well drained	—
Runoff	Rapid to Very Rapid	—
Max Erosion Hazard	High	—
Erosion Factor (k)		
Surface	0.17 (low)	—
Subsurface	0.15 (low)	—
T Value	4	—
Wind Erodability Group	8	—

170 - Supervisor family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EXgp

IV
—

Range Interpretations

Productivity (lb/acre)

600 to 1000

—

Suitability

Summer

—

Most Limiting Factors

Plant competition; 15% rock outcrop; high erosion hazard; steep slopes

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

—

Picnic Areas

Severe: Slope

—

Paths & Trails

Severe: Slope

—

Engineering Interpretations

Unified Class

Surface

SC

—

Subsoil

—

—

Substratum

GW-GM

—

AASHTO Class

Surface

A-4

—

Subsoil

—

—

Substratum

A-2-6

—

Suitability for

Sand

Unsuited

—

Gravel

Fair: Excess fines

—

Topsoil

Poor: Slope; Small stones

—

Roadfill

Poor: Slope

—

Included Areas & Remarks

Included in this map unit are small areas of the Bartine family, on mountainsides; the Packham family, on smooth-shaped mountainsides; and metasedimentary rubbleland, on mountainsides. Included areas make up approximately 20 percent of the map unit area.

171 - Swift Creek family - Rock outcrop, limestone complex, 15 to 30 percent slopes

Elevation: 10,000 to 11,710 feet Annual Precipitation: 11 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Swift Creek family

70 percent

Mountainsides

15 to 30 percent

Buckwheat (*Erigonum* spp.); Bluegrass (*Poa* spp.)

Rock outcrop, limestone

15 percent

Ridges and upper mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 7 inches; brown & pale brown very cobbly sandy loam; weak very fine & fine subangular blocky structure; strongly to violently effervescent; mildly to moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

7 to 35 inches; light yellowish brown & very pale brown very cobbly & extremely cobbly sandy loam; weak very fine subangular blocky structure and massive; violently effervescent; moderately alkaline

—

35 inches; fractured dolomite bedrock

Soil Properties

Restrictive Layer Depth

21 to 40 inches FB

—

Effective Rooting Depth (inches)

21 to 40 inches

—

Available Water Capacity

Very low (0.8 to 1.8 inches)

—

Water Retention Class

3 (0.8 to 1.1 inches)

—

Hydrologic Soil Group

B

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid

—

Max Erosion Hazard

Moderate

—

Erosion Factor (k)

Surface

0.15 (low)

—

Subsurface

0.10 (low)

—

T Value

2

—

Wind Erodability Group

8

—

171 - Swift Creek family - Rock outcrop (continued)

Soil Manageability Group Class

III
3Pex

III
—

Range Interpretations

Productivity (lb/acre) 200 to 300
Suitability Summer
Most Limiting Factors 15% rock outcrop

—
—
—

Recreation Interpretations - Limitations for

Camp Areas Severe: Slope
Picnic Areas Severe: Slope
Paths & Trails 15-25% slopes:
Moderate - large & small stones
25-30% slopes:
Severe: Slope

—
—
—

Engineering Interpretations

Unified Class Surface Subsoil Substratum

SM
—
GM; GW-GM

—
—
—

AASHTO Class Surface Subsoil Substratum

A-1-b; A-2-4
—
A-1-a; A-1-b; A-2-4

—
—
—

Suitability for Sand Gravel Topsoil Roadfill

Unsuited
Poor: Excess fines; thin layer
Poor: Slope; Small stones
15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of the Swift Creek family, 30 to 60 percent slopes, on mountainsides; and the Supervisor family, on mountainsides. Included areas make up approximately 15 percent of the map unit area.

Rock outcrop is dolomite.

172 - Theriot family - Rock outcrop, limestone association, 15 to 30 percent slopes

Elevation: 4,450 to 6,400 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Theriot family

60 percent
Mid to lower mountainsides
15 to 30 percent
Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*)

Rock outcrop, limestone

20 percent
Upper mountainsides and ridges

Soil Profile Description

Surface Layer

0 to 6 inches; pale brown & light yellowish brown gravelly sandy loam and very cobbly sandy loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

6 inches; hard limestone bedrock

—

Soil Properties

Restrictive Layer Depth

6 to 18 inches HB

—

Effective Rooting Depth (inches)

6 to 18 inches

—

Available Water Capacity

Very low (0.4 to 1.4 inches)

—

Water Retention Class

2 to 3 (0.4 to 1.4 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid

—

Max Erosion Hazard

Moderate

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

172 - Theriot family - Rock outcrop (continued)

Soil Manageability Group Class

IV
4DPXe

IV
—

Range Interpretations

Productivity (lb/acre) Suitability Most Limiting Factors

300 to 500

—

Summer - Autumn

—

Plant competition; 60% shallow soils; 20%
rock outcrop

—

Recreation Interpretations - Limitations for

Camp Areas Picnic Areas Paths & Trails

Severe: Slope; depth to rock

—

Severe: Slope

—

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - Slope

—

Engineering Interpretations

Unified Class Surface Subsoil Substratum

GW-GM; GM-GC

—

—

—

—

—

AASHTO Class Surface Subsoil Substratum

A-1-a; A-1-b; A-2-4

—

—

—

—

—

Suitability for Sand Gravel Topsoil Roadfill

Unsuited

—

Poor: Excess fines; thin layer

—

Poor: Slope; area reclaim; Small stones

—

15-25% slopes:

—

Poor - Area reclaim

25-30% slopes:

Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Blackston family, 9 to 15 percent slopes, on colluvial toeslopes; and a soil similar to the Theriot family, but greater than 20 inches to bedrock, on toeslopes and lower mountainsides. Included areas make up approximately 20 percent of the map unit area.

173 - Theriot family - Rock outcrop, limestone association, 30 to 60 percent slopes

Elevation: 4,160 to 7,400 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Theriot family

50 percent
Mid to lower mountainsides
30 to 60 percent
Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*)

Rock outcrop, limestone

30 percent
Upper mountainsides and ridges
—
—

Soil Profile Description

Surface Layer

0 to 6 inches; pale brown & light yellowish brown gravelly sandy loam & very cobbly sandy loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

6 inches; hard limestone bedrock

—

Soil Properties

Restrictive Layer Depth

6 to 18 inches HB

—

Effective Rooting Depth (inches)

6 to 18 inches

—

Available Water Capacity

Very low (0.4 to 1.4 inches)

—

Water Retention Class

2 to 3 (0.4 to 1.4 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Rapid to Very Rapid

—

Max Erosion Hazard

Moderate to High

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

173 - Theriot family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4DEPXg

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 500
Summer - Autumn
Plant competition; 50% shallow soils; 30%
rock outcrop; high erosion hazard; steep
slopes

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Slope; depth to rock
Severe: Slope
Severe: Slope

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

GW-GM; GM-GC
—
—

—
—
—

AASHTO Class
Surface
Subsoil
Substratum

A-1-a; A-1-b; A-2-4
—
—

—
—
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Poor: Excess fines; thin layer
Poor: Slope; area reclaim; Small stones
Poor: Slope; area reclaim

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of the Blackston family, 15 to 30 percent slopes, on colluvial toeslopes; and a soil similar to the Theriot family, but greater than 20 inches to bedrock, 15 to 60 percent slopes, on toeslopes and lower mountainsides. Included areas make up approximately 20 percent of the map unit area.

174 - Theriot family - Rock outcrop, limestone association, 60 to 80 percent slopes

Elevation: 4,150 to 7,700 feet Annual Precipitation: 6 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Theriot family

45 percent
Mid to lower mountainsides
60 to 80 percent
Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*)

Rock outcrop, limestone

35 percent
Upper mountainsides and ridges
—
—

Soil Profile Description

Surface Layer

0 to 6 inches; pale brown & light yellowish brown gravelly sandy loam and very cobbly sandy loam; weak fine granular structure; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

—

—

Substratum

6 inches; hard limestone bedrock

—

Soil Properties

Restrictive Layer Depth

6 to 18 inches HB

—

Effective Rooting Depth (inches)

6 to 18 inches

—

Available Water Capacity

Very low (0.4 to 1.4 inches)

—

Water Retention Class

2 to 3 (0.4 to 1.4 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

2.0 to 6.0

—

Drainage Class

Well drained

—

Runoff

Very Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.10 (low)

—

Subsurface

0.05 (low)

—

T Value

1

—

Wind Erodability Group

8

—

174 - Theriot family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4DEGPX

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 500
Summer - Autumn
Plant competition; 45% shallow soils; 35%
rock outcrop; high erosion hazard; very steep
slopes

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Slope; depth to rock
Severe: Slope
Severe: Slope

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum

GW-GM; GM-GC
—
—

—
—
—

A-1-a; A-1-b; A-2-4
—
—

—
—
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Poor: Excess fines; thin layer
Poor: Slope; area reclaim; Small stones
Poor: Slope; area reclaim

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of the Blackston family, 30 to 60 percent slopes, on colluvial toeslopes; and a soil similar to the Theriot family, but greater than 20 inches to bedrock, 30 to 80 percent slopes, on toeslopes and lower mountainsides. Included areas make up approximately 20 percent of the map unit area.

175 - Toeja - Berning - Simpson families association, 15 to 60 percent slopes

Elevation: 6,800 to 9,240 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Toeja family

35 percent
Northerly and easterly-facing mountainsides
30 to 60 percent
Singleleaf Pinyon Pine (*Pinus monophylla*); Curleaf Mountain Mahogany (*Cercocarpus ledifolius*); Big Sagebrush (*Artemesia tridentata*)

Berning family

20 percent
Southerly and westerly-facing mountainsides
30 to 60 percent
Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemesia tridentata*)

Simpson family

15 percent
Benches of southerly and westerly-facing mountainsides
15 to 30 percent
Singleleaf Pinyon Pine (*Pinus monophylla*); Big Sagebrush (*Artemesia tridentata*)

Soil Profile Description

Surface Layer

1 to 0 inches: Litter
0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline

0 to 4 inches; light brownish gray extremely stony loamy sand; weak fine & medium subangular blocky structure; neutral

0 to 8 inches; pale brown & brown gravelly loamy sand & sandy loam; weak fine & medium subangular blocky structure; neutral to mildly alkaline

Subsoil

12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline

4 to 24 inches; pale brown & reddish yellow very stony loam & very cobbly clay; weak fine & medium subangular blocky structure & massive; neutral to mildly alkaline

8 to 23 inches; light yellowish brown & reddish yellow clay loam & cobbly clay loam; moderate fine prismatic & moderate fine, medium & coarse subangular blocky structure; strongly effervescent; moderately alkaline

Substratum

22 inches; Weathered rhyolite (paralithic contact)

24 inches; hard, highly fractured rhyolite bedrock

23 inches; andesite bedrock

Soil Properties

Restrictive Layer Depth

21 to 24 inches PARA

20 to 40 inches FB

20 to 40 inches HB

Effective Rooting Depth (inches)

21 to 24 inches

20 to 40 inches

20 to 40 inches

Available Water Capacity

Low (2.4 to 3.4 inches)

Very low to low (1.2 to 2.7 inches)

Low to moderate (2.3 to 5.8 inches)

Water Retention Class

1 to 2 (2.1 to 2.7 inches)

2 to 3 (1.1 to 1.3 inches)

1 to 2 (2.3 to 2.9 inches)

Hydrologic Soil Group

C

B

C

Permeability (in./hr.)

0.2 to 0.6

0.06 to 0.20

0.2 to 0.6

Drainage Class

Well drained

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Rapid

Max Erosion Hazard

High to Very High

Very High

Moderate

Erosion Factor (k)

Surface

0.10 (low)

0.02 (low)

0.05 (low)

Subsurface

0.28 (moderate)

0.05 (low)

0.15 (low)

T Value

2

2

2

Wind Erodability Group

8

8

8

175 - Toeja - Berning - Simpson families association (continued)

Soil Manageability Group Class

III
3Egx

III
3Egpx

III
2ex

Range Interpretations

Productivity (lb/acre)

600 to 1000

300 to 500

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 5% rock
outcrop; very high erosion
hazard; steep slopes

Plant competition; 5% rock
outcrop; very high erosion
hazard; steep slopes

Plant competition; 5% rock
outcrop; very high erosion
hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; small stones

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope; small slopes

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope; small stones

15-25% slopes:
Moderate - Slope;
too sandy; small stones
25-30% slopes:
Severe - Slope

Engineering Interpretations

Unified Class

Surface

SM

GP

SM

Subsoil

SM

SM

ML

Substratum

—

—

—

AASHTO Class

Surface

A-4

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

Subsoil

A-2-7

A-2-6

A-7-6

Substratum

—

—

—

Suitability for

Sand

Poor: Excess fines

Poor: Excess fines

Unsuited

Gravel

Unsuited

Unsuited

Unsuited

Topsoil

Poor: Slope; small stones

Poor: Slope; large and small
stones

Poor: Slope

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim

15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Toeja family, 15 to 30 percent slopes, on northerly and easterly-facing mountainsides; the Sumine family, 30 to 60 percent slopes, on northerly and easterly-facing mountainsides; a soil similar to the Moano family, but moister, 50 to 75 percent slopes, on eroded southerly and westerly-facing mountainsides; and rhyolite rock outcrop, on ridges and mountainsides. Included areas make up approximately 30 percent of the map unit area.

176 - Toeja - Merlin families complex, 30 to 60 percent slopes

Elevation: 6,760 to 7,620 feet Annual Precipitation: 11 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Toeja family

50 percent
Mountainsides
30 to 60 percent
Singleleaf Pinyon Pine (*Pinus monophylla*);
Curleaf Mountain Mahogany (*Cercocarpus ledifolius*); Big Sagebrush (*Artemesia tridentata*)

Merlin family

30 percent
Mountainsides
30 to 60 percent
Low Sagebrush (*Artemesia arbuscula*);
Squirreltail (*Sitanion* spp.)

Soil Profile Description

Surface Layer

1 to 0 inch; Litter

0 to 4 inches; brown gravelly & very gravelly sandy loam; weak fine granular & subangular blocky structure; slightly to medium acid

0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline

Subsoil

12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline

4 to 15 inches; brown gravelly clay loam; moderate fine & medium subangular blocky structure; neutral

Substratum

22 inches; weathered rhyolite bedrock (paralithic contact)

15 inches; basalt bedrock

Soil Properties

Restrictive Layer Depth

21 to 24 inches PARA

10 to 20 inches HB

Effective Rooting Depth (inches)

21 to 24 inches

10 to 20 inches

Available Water Capacity

Low (2.4 to 3.4 inches)

Very low to low (1.3 to 3.2 inches)

Water Retention Class

1 to 2 (2.1 to 2.7 inches)

1 to 2 (1.3 to 3.2 inches)

Hydrologic Soil Group

C

D

Permeability (in./hr.)

0.2 to 0.6

0.2 to 0.6

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Max Erosion Hazard

High to Very High

High

Erosion Factor (k)

Surface

0.10 (low)

0.02 (low)

Subsurface

0.28 (moderate)

0.24 (moderate)

T Value

2

1

Wind Erodability Group

8

8

176 - Toeja - Merlin families complex (continued)

Soil Manageability
Group
Class

III
3Eg

III
3Edgp

Range Interpretations

Productivity (lb/acre)

600 to 1000

200 to 250

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; very high erosion hazard;
steep slopes

Plant competition; very high erosion hazard;
steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope

Engineering Interpretations

Unified Class

Surface

SM

SM-SC

Subsoil

SM

ML

Substratum

—

—

AASHTO Class

Surface

A-4

A-2-4; A-4

Subsoil

A-2-7

A-7-6

Substratum

—

—

Suitability for

Sand

Poor: Excess fines

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope; small stones

Poor: Slope; area reclaim; Small stones

Roadfill

Poor: Slope; area reclaim

Poor: Slope; area reclaim; low strength

Included Areas & Remarks

Included in this map unit are small areas of the Spaa family, on mountainsides; and a soil similar to the Berent family, but colder on 15 to 30 percent slopes, in depressions, superimposed on the Toeja and Merlin family components. Included areas make up approximately 20 percent of the map unit area.

177 - Toeja - Merlin families - Rock outcrop, volcanic complex, 5 to 40 percent slopes

Elevation: 6,680 to 8,050 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Toeja family	Merlin family	Rock outcrop, volcanic
Approx Proportion	40 percent	25 percent	15 percent
Landscape Position	Mountainsides	Ridges, hilltops, and benches of mountainsides	Ridges and mountainsides
Slope	15 to 40 percent	5 to 15 percent	—
Typical Vegetation	Singleleaf Pine (<i>Pinus monophylla</i>); Curlleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>); Big Sagebrush (<i>Artemesia tridentata</i>)	Low Sagebrush (<i>Artemesia arbuscula</i>); Squirreltail (<i>Sitanion</i> spp.)	—

Soil Profile Description

Surface Layer	1 to 0 inch; Litter 0 to 12 inches; light brownish gray & grayish brown very cobbly sandy loam & gravelly loam; weak very coarse platy & weak medium subangular blocky structure; moderately alkaline	0 to 4 inches; brown gravelly & very gravelly sandy loam; weak fine granular & weak subangular blocky structure; slightly to medium acid	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	12 to 22 inches; yellowish brown gravelly sandy clay loam; strong fine & medium subangular blocky structure; moderately alkaline	4 to 15 inches; brown gravelly clay loam; moderate fine & medium subangular blocky structure; neutral	—
Substratum	22 inches; weathered rhyolite bedrock (paralithic contact)	15 inches; basalt bedrock	—

Soil Properties

Restrictive Layer Depth	21 to 24 inches PARA	10 to 20 inches HB	—
Effective Rooting Depth (inches)	21 to 24 inches	10 to 20 inches	—
Available Water Capacity	Low (2.4 to 3.4 inches)	Very low to low (1.3 to 3.2 inches)	—
Water Retention Class	1 to 2 (2.1 to 2.7 inches)	1 to 2 (1.3 to 3.2 inches)	—
Hydrologic Soil Group	C	D	—
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	—
Drainage Class	Well drained	Well drained	—
Runoff	Rapid	Medium	—
Max Erosion Hazard	High	Moderate	—
Erosion Factor (k)			
Surface	0.10 (low)	0.02 (low.)	—
Subsurface	0.28 (moderate)	0.24 (moderate)	—
T Value	2	1	—
Wind Erodability Group	8	8	—

177 - Toeja - Merlin families - Rock outcrop (continued)

Soil Manageability Group Class

II
3Ex

II
2edpx

II
—

Range Interpretations

Productivity (lb/acre)

600 to 1000

200 to 250

—

Suitability

Summer - Autumn

Summer - Autumn

—

Most Limiting Factors

Plant competition; high erosion hazard; 15% rock outcrop

Plant competition; high erosion hazard; 15% rock outcrop

—

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

5-8% slopes:
Moderate - large & small stones; percs slowly
8-15% slopes:
Moderate - slope; large & small stones; percs slowly

—

Picnic Areas

Severe: Slope

5-8% slopes:
Moderate - large & small stones
8-15% slopes:
Moderate - slope; large & small stones

—

Paths & Trails

15-25% slopes:
Moderate - slope; large stones
25-40% slopes:
Severe - slope

Moderate: large & small stones

—

Engineering Interpretations

Unified Class

Surface

SM

SM-SC

—

Subsoil

SM

ML

—

Substratum

—

—

—

AASHTO Class

Surface

A-4

A-2-4; A-4

—

Subsoil

A-2-7

A-7-6

—

Substratum

—

—

—

Suitability for

Sand

Poor: Excess fines

Unsuited

—

Gravel

Unsuited

Unsuited

—

Topsoil

Poor: Slope; small stones

Poor: small stones; area reclaim

—

Roadfill

15-25% slopes:
Poor - area reclaim
25-40% slopes:
Poor - slope; area reclaim

Poor: Low strength; area reclaim

—

Included Areas & Remarks

Included in this map unit are small areas of St. Marys family, 15 to 30 percent slopes, on mountain toeslopes; and a soil similar to the Berent family, but cooler, on 5 to 15 percent slopes, on sand dunes in valleys. Included areas make up approximately 20 percent of the map unit area.

Rock outcrop is basalt

178 - Trocken-Bluewing families complex, 15 to 30 percent slopes

Elevation: 3,800 to 6,320 feet Annual Precipitation: 6 to 7 inches

Soil Map Unit Components	Trocken family	Bluewing family
Approx Proportion	60 percent	20 percent
Landscape Position	Alluvial fans	Alluvial fans
Slope	15 to 30 percent	15 to 30 percent
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Greenfire (<i>Menodora</i> spp.)	Shadscale (<i>Artiplex confertifolia</i>); Boxthorn (<i>Lycium</i> spp.)

Soil Profile Description

Surface Layer	0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline	0 to 3 inches; pale brown very stony loamy fine sand; weak fine granular structure; moderately alkaline
Subsoil	—	—
Substratum	9 to 60 inches; light yellowish brown very gravelly sandy loamy; massive; moderately alkaline	3 to 60 inches; pale brown very cobbly loamy fine sand; very fine single grained; moderately alkaline

Soil Properties

Restrictive Layer Depth	24 to 60+ inches HB	Greater than 60 inches
Effective Rooting Depth (inches)	20 to 40 inches	40 to 60 inches
Available Water Capacity	Very low to low (1.3 to 4.0 inches)	Very low to low (1.8 to 2.2 inches)
Water Retention Class	2 to 3 (1.1 to 1.4 inches)	3 (0.7 to 0.9 inches)
Hydrologic Soil Group	B	A
Permeability (in./hr.)	2.0 to 6.0	6.0 to 20.0
Drainage Class	Well drained	Somewhat Excessive
Runoff	Rapid	Rapid
Max Erosion Hazard	High	Moderate to High
Erosion Factor (k)		
Surface	0.10 (low)	0.05 (low)
Subsurface	0.05 (low)	0.05 (low)
T Value	3	4
Wind Erodability Group	8	2

178 - Trocken-Bluewing families complex (continued)

Soil Manageability Group Class

III
3Ep

III
2ep

Range Interpretations

Productivity (lb/acre)

300 to 400

100 to 300

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; high erosion hazard

Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; large stones

Picnic Areas

Severe: Slope

Severe: Slope; large stones

Paths & Trails

15-25% slopes:
Moderate - slope; small stones
25-30% slopes:
Severe - slope

Severe: Slope; large stones

Engineering Interpretations

Unified Class

Surface

SM

SM-SC

Subsoil

—

—

Substratum

GW-GM; GM-GC

GW-GM

AASHTO Class

Surface

A-1-b; A-2-4

A-2-4

Subsoil

—

—

Substratum

A-1-a; A-1-b; A-2-4

A-1-b; A-2-4

Suitability for

Sand

Unsuited

Poor: Excess fines

Gravel

Poor: Excess fines

Fair: Excess fines; large stones

Topsoil

Poor: Slope; small stones

Poor: Slope; large & small stones

Roadfill

15-25% slopes:

15-25% slopes:

Fair - slope

Fair - slope; large stones

25-30% slopes:

25-30% slopes:

Poor - slope

Poor - slope

Included Areas & Remarks

Included in this map unit are small areas of the Slinger family, on alluvial fans; and Lithic Camborthids, on sideslopes of alluvial fans. Included areas make up approximately 20 percent of the map unit area.

179 - Trocken family - Rock outcrop, metasedimentary complex, 60 to 80 percent slopes

Elevation: 4,800 to 8,000 feet Annual Precipitation: 9 inches

Soil Map Unit Components	Trocken family	Rock outcrop, metasedimentary
Approx Proportion	40 percent	25 percent
Landscape Position	Mountainsides & tops	Mountainsides & ridges
Slope	60 to 80 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemesia tridentata</i>); Greenfire (<i>Menodora</i> spp.)	

Soil Profile Description

Surface Layer	0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	—	—
Substratum	9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline	—

Soil Properties

Restrictive Layer Depth	24 to 60+ inches HB	—
Effective Rooting Depth (inches)	20 to 40 inches	—
Available Water Capacity	Very low to low (1.3 to 4.0 inches)	—
Water Retention Class	2 to 3 (1.1 to 1.4 inches)	—
Hydrologic Soil Group	B	—
Permeability (in./hr.)	2.0 to 6.0	—
Drainage Class	Well drained	—
Runoff	Very Rapid	—
Max Erosion Hazard	Very High	—
Erosion Factor (k)		
Surface	0.10 (low)	—
Subsurface	0.05 (low)	—
T Value	3	—
Wind Erodability Group	8	—

179 - Trocken family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EGXp

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 400
Summer - Autumn
Plant competition; 25% rock outcrop; very
high erosion hazard; very steep slopes

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Slope
Severe: Slope
Severe: Slope

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum

SM
—
GW-GM; GM-GC
A-1-b; A-2-4
—
A-1-a; A-1-b; A-2-4

—
—
—
—
—
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Poor: Excess fines
Poor: Slope; small stones
Poor: Slope

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, 30 to 60 percent slopes, on mountainsides; a soil similar to the Hartig family, but warmer, 30 to 80 percent slopes, on mountain tops with tuff intrusions; a soil similar to the Mexispring family, but shallow to hard bedrock, on mountainsides, near rock outcroppings; and schistose rubbleland, on mountainsides. Included areas make up approximately 35 percent of the map unit area.

Rock outcrop is schistose.

180 - Trocken - Midas families association, 5 to 60 percent slopes

Elevation: 5,200 to 7,750 feet Annual Precipitation: 9 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Trocken family

50 percent
Sideslopes of alluvial fans
30 to 60 percent
Big Sagebrush (*Artemesia tridentata*);
Greenfire (*Mendora spp.*)

Midas family

20 percent
Alluvial fan tops and stable ridge crests
5 to 30 percent
Greenfire (*Menodora spp.*); Fourwing Saltbrush
(*Atriplex canescens*)

Soil Profile Description

Surface Layer

0 to 9 inches; light brownish gray & pale brown very gravelly sandy loam; weak fine granular structure; moderately alkaline

0 to 4 inches; pale brown very gravelly sandy loam; weak fine granular structure; strongly effervescent; moderately alkaline

Subsoil

—

4 to 14 inches; light yellowish brown very gravelly sandy loam; massive; strongly effervescent; moderately alkaline

Substratum

9 to 60 inches; light yellowish brown very gravelly sandy loam; massive; moderately alkaline

14 to 60 inches; light yellowish brown very gravelly & extremely gravelly loamy sand; massive; moderately alkaline

Soil Properties

Restrictive Layer Depth

24 to 60+ inches HB

Greater than 60 inches

Effective Rooting Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water Capacity

Very low to low (1.3 to 4.0 inches)

Very low to low (1.8 to 2.4 inches)

Water Retention Class

2 to 3 (1.1 to 1.4 inches)

3 (1.0 to 1.2 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Medium to Rapid

Max Erosion Hazard

High to Very High

High to Very High

Erosion Factor (k)

Surface

0.10 (low)

0.10 (low)

Subsurface

0.05 (low)

0.17 (low)

T Value

3

2

Wind Erodability Group

8

8

Soil Manageability

Group

III

III

Class

3Egp

4EP

180 - Trocken - Midas families association (continued)

Range Interpretations
Productivity (lb/acre)
Suitability
Most Limiting
Factors

300 to 400

Summer - Autumn

Plant competition; very high erosion hazard;
steep slopes

300 to 400

Summer - Autumn

Plant competition; very high erosion hazard;
steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

5-8% slopes:

Moderate - small stones

8-15% slopes:

Moderate - slope; small stones

15-30% slopes:

Severe - slope

Picnic Areas

Severe: Slope

5-8% slopes:

Moderate - small stones

8-15% slopes:

Moderate - slope; small stones

15-30% slopes:

Severe - slope

Paths & Trails

Severe: Slope

5-15% slopes:

Moderate - small stones

15-25% slopes:

Moderate - slope; small stones

25-30% slopes:

Severe - slope

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SM

—

GW-GM; GM-GC

GW-GM; GM-GC

SM-SC

SW-SM; SM-SC

AASHTO Class
Surface
Subsoil
Substratum

A-1-b; A-2-4

—

A-1-a; A-1-b; A-2-4

A-1-a; A-1-b; A-2-4

A-2-4; A-4

A-1-a; A-1-b; A-2-4

Suitability for
Sand
Gravel
Topsoil

Unsuited

Poor: Excess fines

Poor: Slope; small stones; area reclaim

Unsuited

Fair: Excess fines

5-15% slopes:

Poor - small stones

15-30% slopes:

Poor - slope; small stones

5-15% slopes:

Fair - large stones

15-25% slopes:

Fair - slope; large stones

25-30% slopes:

Poor - slope

Roadfill

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Bluewing family, but shallow to fractured hardpan, 30 to 60 percent slopes, on upper erosional shoulders of alluvial fans; a soil similar to the Spanel family, but with more than 35 percent rock fragments in the profile, 5 to 15 percent slopes, on stable ridgecrests; a soil similar to the Spanel family, but with a degrading hardpan, 5 to 15 percent slopes, on stable sloping fans. Included areas make up approximately 30 percent of the map unit area.

181 - Tweedy - Abgese families association, 1 to 15 percent slopes

Elevation: 6,950 to 8,050 feet Annual Precipitation: 10 to 11 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Tweedy family

65 percent
Basalt flow tops
1 to 9 percent
Juniper (*Juniperus* spp.); Singleleaf Pinyon (*Pinus monophylla*)

Abgese family

20 percent
Sideslopes of basalt flows
9 to 15 percent
Big Sagebrush (*Artemisia tridentata*); Singleleaf Pinyon Pine (*Pinus monophylla*)

Soil Profile Description

Surface Layer

0 to 7 inches; grayish brown sandy loam; weak fine granular & weak fine subangular blocky structure; neutral

0 to 5 inches; brown sandy loam; weak fine granular structure; mildly alkaline

Subsoil

7 to 32 inches; brown & yellowish brown clay loam, gravelly clay loam & gravelly sandy loam; weak to strong very fine, fine, medium & coarse subangular blocky structure; neutral

5 to 16 inches; yellowish brown sandy loam & gravelly sandy loam; moderate medium subangular blocky structure & massive; mildly alkaline

Substratum

32 to 38 inches; pale brown very gravelly sand; massive; neutral

16 to 60 inches; yellowish brown very gravelly sandy loam; massive; mildly alkaline

38 inches; hard basalt bedrock

Soil Properties

Restrictive Layer Depth

20 to 40 inches HB

Greater than 60 inches

Effective Rooting Depth (inches)

20 to 40 inches

40 to 60 inches

Available Water Capacity

Low to moderate (2.0 to 5.0 inches)

Moderate (4.6 to 5.7 inches)

Water Retention Class

1 (2.6 to 3.2 inches)

2 (1.7 to 2.1 inches)

Hydrologic Soil Group

C

B

Permeability (in./hr.)

0.2 to 0.6

2.0 to 6.0

Drainage Class

Well drained

Well drained

Runoff

Slow to Medium

Medium

Max Erosion Hazard

Moderate

Moderate

Erosion Factor (k)

Surface

0.20 (moderate)

0.15 (low)

Subsurface

0.28 (moderate)

0.17 (low)

T Value

2

3

Wind Erodability Group

3

3

181 - Tweedy - Abgese families association (continued)

Soil Manageability Group Class

II
2e

II
2ep

Range Interpretations

Productivity (lb/acre)	400 to 600	500 to 700
Suitability	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition	Plant competition

Recreation Interpretations - Limitations for

Camp Areas	1-8% slopes: Moderate - percs slowly 8-9% slopes: Moderate - slope; percs slowly	Moderate: Slope
Picnic Areas	1-8% slopes: Slight 8-9% slopes: Moderate - slope	Moderate: Slope
Paths & Trails	Slight	Slight

Engineering Interpretations

Unified Class	SM	SM-SC
Surface	CL	SM-SC
Subsoil	SP	SM
Substratum		
AASHTO Class		
Surface	A-2-4; A-4	A-2-4
Subsoil	A-4	A-2-4
Substratum	A-1-a; A-1-b; A-2-4	A-1-b; A-2-4
Suitability for		
Sand	Unsuited	Unsuited
Gravel	Unsuited	Unsuited
Topsoil	1-8% slopes: Fair - small stones 8-9% slopes: Fair - slope; small stones	Fair: Slope; small stones
Roadfill	Poor: Area reclaim	Good

Included Areas & Remarks

Included in this map unit are small areas of the Preston family, 1 to 9 percent slopes, on stabilized sand dunes; the Wrango family, 9 to 15 percent slopes, in transitional areas between the sand dunes and the Abgese soil; and a soil similar to the Wrango family, but with a stratified profile, 1 to 9 percent slopes, in drainages. Included areas make up approximately 15 percent of the map unit area.

182 - Typic Haplargids - Vipont - Spaa families complex, 5 to 70 percent slopes

Elevation: 7,080 to 10,250 feet Annual Precipitation: 9 to 10 inches

Soil Map Unit Components	Typic Haplargids	Vipont family	Spaa family
Approx Proportion	30 percent	25 percent	25 percent
Landscape Position	Mountainsides	Mountainsides	Ridges & mountainsides
Slope	15 to 60 percent	60 to 70 percent	5 to 60 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Ephedra spp.; Bluegrass (<i>Poa</i> spp.)	Big Sagebrush (<i>Artemisia tridentata</i>); Curleaf Mountain Mahogany (<i>Cercocarpus ledifolius</i>)

Soil Profile Description

Surface Layer	0 to 2 inches; light reddish brown & white very gravelly clay loam; weak very fine & fine subangular blocky structure; mildly alkaline	0 to 17 inches; grayish brown & brown extremely cobbly loamy sand & cobbly & very cobbly sandy loam; weak fine subangular blocky structure & massive; moderately alkaline	0 to 3 inches; brown very cobbly sandy loam; weak medium & coarse platy structure; medium acid
Subsoil	2 to 15 inches; light reddish brown clay; moderate medium prismatic structure; slightly to strongly effervescent; moderately alkaline	17 to 35 inches; brown & light yellowish brown very cobbly sandy loam & very gravelly clay loam; massive; moderately alkaline	—
Substratum	15 to 43 inches; brown, pinkish gray & white loam & very gravelly loam; massive; violently effervescent; moderately alkaline 43 inches; rhyolite tuff (paralithic contact)	35 to 60 inches; light yellowish brown & pale brown extremely cobbly sandy loam; massive; violently effervescent; moderately alkaline	3 to 16 inches; brown & pale brown sandy loam & gravelly sandy loam; weak fine & medium subangular blocky structure; slightly acid 16 inches; hard rhyolite bedrock

Soil Properties

Restrictive Layer Depth	22 to 60 inches PARA	Greater than 60 inches	12 to 16 inches HB
Effective Rooting Depth (inches)	20 to 40 inches	40 to 60 inches	10 to 16 inches
Available Water Capacity	Low to moderate (2.3 to 7.5 inches)	Low (2.8 to 3.6 inches)	Very low (0.9 to 1.6 inches)
Water Retention Class	1 (2.6 to 3.1 inches)	2 to 3 (0.9 to 1.3 inches)	2 to 3 (0.9 to 1.6 inches)
Hydrologic Soil Group	D	B	D
Permeability (in./hr.)	0.06 to 0.20	0.2 to 0.6	2.0 to 6.0
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to Very Rapid	Very Rapid	Medium to Very Rapid
Max Erosion Hazard	High	High	Moderate to High
Erosion Factor (k)			
Surface	0.10 (low)	0.02 (low)	0.10 (low)
Subsurface	0.20 (moderate)	0.15 (low)	0.24 (moderate)
T Value	3	3	1
Wind Erodability Group	8	8	8

182 - Typic Haplargids - Vipont - Spaa families complex (continued)

Soil Manageability Group Class	IV 3Egx	IV 4EGPx	IV 4EPdgx
Range Interpretations			
Productivity (lb/acre)	400 to 600	500 to 700	600 to 1000
Suitability	Summer - Autumn	Summer - Autumn	Summer - Autumn
Most Limiting Factors	Plant competition; 25% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes	Plant competition; 25% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes	Plant competition; 25% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes
Recreation Interpretations - Limitations for			
Camp Areas	Severe: Slope	Severe: Slope; large stones	5-8% slopes: Moderate - large & small stones; too sandy 8-15% slopes: Moderate - slope; large & small stones; too sandy 15-60% slopes: Severe - slope
Picnic Areas	Severe: Slope	Severe: Slope; large stones	5-8% slopes: Moderate - large & small stones; too sandy
Paths & Trails	Severe: Slope	Severe: Slope; large stones	8-15% slopes: Moderate - slope; large & small stones; too sandy 15-60% slopes: Severe - slope
Engineering Interpretations			
Unified Class	GM	SM	SM; SW-SM
Surface	ML	SC	—
Subsoil	SM-SC	GM; GW-GM	SM
Substratum			
AASHTO Class			
Surface	A-2-6	A-2-4	A-1-b; A-2-4
Subsoil	A-7-6	A-2-4	—
Substratum	A-2-4; A-4	A-1-a; A-1-b; A-2-4	A-2-4
Suitability for			
Sand	Unsuited	Unsuited	Poor: Excess fines
Gravel	Unsuited	Unsuited	Unsuited
Topsoil	Poor: Slope; too clayey; small stones	Poor: Slope; large stones	5-15% slopes: Poor - small stones; area reclaim 15-60% slopes: Poor - slope; small stones; area reclaim
Roadfill	Poor: Slope	Poor: Slope; large stones	5-25% slopes: Poor - area reclaim 25-60% slopes: Poor - slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of eroded phases of the Vipont family and Typic Haplargids, 15 to 70 percent slopes, on mountainsides; and rhyolitic rock outcrop and rubbleland, on mountainsides and ridges. Included areas make up approximately 20 percent of the map unit area.

183 - Typic Xerorthents, 2 to 15 percent slopes

Elevation: 6,700 to 7,800 feet Annual Precipitation: 8 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Typic Xerorthents

65 percent

Alluvial depressions

2 to 15 percent

Saltgrass (*Distichlis* spp.); Rabbitbrush
(*Chrysothamnus* spp.)

Soil Profile Description

Surface Layer

0 to 4 inches; light brownish gray gravelly
sand & loamy sand; weak fine granular &
weak very fine subangular blocky structure;
slightly acid

Subsoil

—

Substratum

4 to 60 inches; light brownish gray, & pale
brown loamy sand, gravelly sandy loam &
very cobbly loamy sand; weak very fine, fine,
medium & coarse subangular blocky structure
& massive; neutral

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Effective Rooting
Depth (inches)

20 to 40 inches

Available Water
Capacity

Low to moderate (3.4 to 4.4 inches)

Water Retention Class

2 (1.4 to 1.8 inches)

Hydrologic Soil Group

B

Permeability (in./hr.)

2.0 to 6.0

Drainage Class

Well drained

Runoff

Slow to Medium

Max Erosion Hazard

High

Erosion Factor (k)

Surface

0.05 (low)

Subsurface

0.10 (low)

T Value

3

Wind Erodability
Group

1

183 - Typic Xerorthents (continued)

Soil Manageability
Group
Class

III
3Ep

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

200 to 400
Summer - Autumn
Plant competition; high erosion hazard

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Too sandy
Severe: Too sandy
Severe: Too sandy

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum
Suitability for
Sand
Gravel
Topsoil
Roadfill

SM
—
SM

A-2-4
—
A-1-b; A-2-4

Poor: Excess fines
Unsuited
Poor: Small stones
Good

Included Areas & Remarks

Included in this map unit are small areas of the Berent family and Typic Xerorthents, in alluvial depressions; a soil similar to the Trocken family, but with silty textures in the profile, in playas and depressions; and the Unionville family, 1 to 9 percent slopes, in valley bottoms. Included areas make up approximately 35 percent of the map unit area.

184 - Unionville - Risue families - Rock outcrop, volcanic complex, 5 to 30 percent slopes

Elevation: 6,720 to 8,000 feet Annual Precipitation: 11 inches

Soil Map Unit Components	Unionville family	Risue family	Rock outcrop, volcanic
Approx Proportion	50 percent	20 percent	15 percent
Landscape Position	lava flows	lava flows	lava flows
Slope	5 to 30 percent	5 to 30 percent	—
Typical Vegetation	Juniper (<i>Juniperus</i> spp.); Big Sagebrush (<i>Artemisia tridentata</i>)	Big Sagebrush (<i>Artemisia tridentata</i>); Rabbitbrush (<i>Chrysothamnus</i> spp.)	—

Soil Profile Description

Surface Layer	0 to 4 inches; brown gravelly sandy loam; weak thin platy structure; moderately alkaline	0 to 6 inches; pale brown cobbly loamy sand & loamy sand; weak very fine granular & weak fine & medium subangular blocky structure; neutral	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	4 to 26 inches; pale brown sandy loam; weak medium subangular blocky structure slightly effervescent; moderately alkaline	6 to 16 inches; yellowish brown & brown sandy clay loam & clay; strong very fine, fine, medium & coarse subangular blocky structure; neutral	—
Substratum	26 to 60 inches; pale brown & light yellowish brown gravelly sandy loam; massive; violently effervescent; moderately alkaline	16 inches; silica-cemented hardpan	—

Soil Properties

Restrictive Layer Depth	35 to 60+ inches HB	16 inches DP	—
Effective Rooting Depth (inches)	20 to 40 inches	16 inches	—
Available Water Capacity	low to moderate (2.8 to 6.3 inches)	Very low (1.6 to 2.0 inches)	—
Water Retention Class	2 (1.8 to 2.4 inches)	2 (1.6 to 2.0 inches)	—
Hydrologic Soil Group	B	D	—
Permeability (in./hr.)	2.0 to 6.0	Less than 0.06	—
Drainage Class	Well drained	Well drained	—
Runoff	Medium to Rapid	Medium to Rapid	—
Max Erosion Hazard	High	Moderate to High	—
Erosion Factor (k)			
Surface	0.17 (low)	0.10 (low)	—
Subsurface	0.32 (moderate)	0.15 (low)	—
T Value	2	1	—
Wind Erodability Group	3	8	—
Soil Manageability			
Group	III	III	III
Class	3Epx	2edpx	—

184 - Unionville - Risue families - Rock outcrop (continued)

Range Interpretations			
Productivity (lb/acre)	400 to 600	500 to 700	—
Suitability	Summer - Autumn	Summer - Autumn	—
Most Limiting Factors	Plant competition; 20% shallow soils; 15% rock outcrop; high erosion hazard	Plant competition; 20% shallow soils; 15% rock outcrop; high erosion hazard	—

Recreation Interpretations - Limitations for

Camp Areas	5-8% slopes: slight 8-15% slopes: moderate - slope 15-30% slopes: Severe - slope	5-15% slopes: Severe - percs slowly 15-30% slopes: Severe - slope; percs slowly	—
Picnic Areas	5-8% slopes: slight 8-15% slopes: moderate - slope 15-30% slopes: Severe - slope	5-8% slopes: Moderate - small stones; too sandy 8-15% slopes: Moderate - slope; small stones; too sandy 15-30% slopes: Severe - slope	—
Paths & Trails	5-15% slopes: Slight 15-25% slopes: moderate - slope 25-30% slopes: Severe - slope	5-15% slopes: Moderate - large stones; too sandy 15-25% slopes: Moderate - slope; large stones; too sandy 25-30% slopes: Severe - slope	—

Engineering Interpretations

Unified Class			
Surface	SM	SM	—
Subsoil	SM	ML	—
Substratum	SM	SC	—
AASHTO Class			
Surface	A-1-b; A-2-4	A-2-4	—
Subsoil	A-2-4	A-7-6	—
Substratum	A-1-b; A-2-4	A-4	—
Suitability for			
Sand	Poor: Excess fines	Unsuited	—
Gravel	Unsuited	Unsuited	—
Topsoil	5-8% slopes: Fair - small stones 8-15% slopes: Fair - slope; small stones 15-30% slopes: Poor - slope	5-15% slopes: Poor - area reclaim 15-30% slopes: Poor - slope; area reclaim	—
Roadfill	5-15% slopes: Good 15-25% slopes: Fair - slope 25-30% slopes: Poor - slope	5-25% slopes: Poor - low strength; area reclaim 25-30% slopes: Poor - slope; low strength; area reclaim	—

Included Areas & Remarks

Included in this map unit are small areas of the Berent family, 5 to 15 percent slopes, in depressions; and the Bondbranch family, on upper mountainsides, in eroded areas. Included areas make up approximately 15 percent of the map unit area.

Rock outcrop is basalt

185 - Washoe - Checkett - Mulett families association, 30 to 60 percent slopes

Elevation: 5,000 to 9,000 feet Annual Precipitation: 8 to 9 inches

Soil Map Unit Components	Washoe family	Checkett family	Mulett family
Approx Proportion	35 percent	20 percent	15 percent
Landscape Position	Mid to lower mountainsides	Ridge tops and upper mountainsides	Sideslopes of ridge tops
Slope	30 to 60 percent	30 to 60 percent	30 to 60 percent
Typical Vegetation	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)	Singleleaf Pinyon Pine (<i>Pinus monophylla</i>); Big Sagebrush (<i>Artemisia tridentata</i>)

Soil Profile Description

Surface Layer	0 to 4 inches; light brownish gray very gravelly sandy loam; weak very thin platy structure; neutral	0 to 6 inches; pale brown gravelly fine sandy loam; weak fine granular structure; moderately alkaline	0 to 6 inches; pale brown sandy loam & very gravelly sandy clay loam; weak fine granular structure; mildly alkaline
Subsoil	4 to 19 inches; light brown very gravelly clay loam & sandy clay loam; massive; neutral	6 to 19 inches; yellowish brown very gravelly & very cobbly sandy clay loam; moderate medium subangular blocky structure; moderately alkaline	6 to 13 inches; light yellowish brown very gravelly clay loam; moderate medium subangular blocky structure; mildly alkaline
Substratum	19 to 60 inches; light yellowish brown extremely gravelly sandy loam & loamy sand; massive; strongly to violently effervescent; moderately alkaline	19 inches; hard metasedimentary bedrock	13 inches; hard noncalcareous sedimentary bedrock

Soil Properties

Restrictive Layer Depth	23 to 60+ inches FB	19 to 19 inches HB	10 to 20 inches HB
Effective Rooting Depth (inches)	20 to 40 inches	9 to 19 inches	10 to 20 inches
Available Water Capacity	Very low to low (0.7 to 2.5 inches)	Very low to low (0.8 to 2.1 inches)	Very low to low (1.0 to 2.5 inches)
Water Retention Class	2 (1.3 to 1.6 inches)	2 to 3 (0.8 to 2.1 inches)	2 to 3 (1.0 to 2.5 inches)
Hydrologic Soil Group	B	D	D
Permeability (in./hr.)	0.2 to 0.6	0.2 to 0.6	0.2 to 0.6
Drainage Class	Well drained	Well drained	Well drained
Runoff	Rapid to Very Rapid	Rapid to Very Rapid	Rapid to Very Rapid
Max Erosion Hazard	Moderate to High	Moderate to High	Moderate to High
Erosion Factor (k)			
Surface	0.05 (low)	0.15 (low)	0.15 (low)
Subsurface	0.15 (low)	0.10 (low)	0.10 (low)
T Value	3	1	1
Wind Erodability Group	8	8	3

185 - Washoe - Checkett - Mulett families association (continued)

Soil Manageability
Group
Class

III
3Egpx

III
4EPdgx

III
3Edgpx

Range Interpretations

Productivity (lb/acre)

400 to 500

300 to 500

300 to 500

Suitability

Summer - Autumn

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 35% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 35% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 35% shallow soils; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope; too sandy

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope; too sandy

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope; too sandy

Severe: Slope

Engineering Interpretations

Unified Class

Surface

GM; GW-GM

SM-SC

SM-SC

Subsoil

SC

SC

SC

Substratum

GP

—

—

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

A-2-4; A-4

A-2-4

Subsoil

A-2-6

A-2-4

A-2-6

Substratum

A-1-a; A-1-b; A-2-4

—

—

Suitability for

Sand

Unsuited

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Unsuited

Topsoil

Poor: Slope; Small stones

Poor: Slope; Small stones

Poor: Slope; Small stones; area reclaim

Roadfill

Poor: Slope

Poor: Slope; area reclaim

Poor: Slope; area reclaim

Included Areas & Remarks

Included in this map unit are small areas of the Finley family, 15 to 30 percent slopes, on lower mountainsides and toeslopes; sedimentary rock outcrop, on ridges and mountainsides; the Moano family, 15 to 40 percent slopes, on ridgetops and upper mountainsides; and the Wrango family, 15 to 40 percent slopes, on lower mountainsides and toeslopes. Included areas make up approximately 30 percent of the map unit area.

186 - Washoe family - Typic Haplargids association, 30 to 60 percent slopes

Elevation: 7,120 to 9,550 feet Annual Precipitation: 9 to 10 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Washoe family

40 percent

Southerly and westerly-facing mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*);
Big Sagebrush (*Artemisia tridentata*)

Typic Haplargids

30 percent

Northerly and easterly-facing mountainsides

30 to 60 percent

Singleleaf Pinyon Pine (*Pinus monophylla*); Big
Sagebrush (*Artemisia tridentata*)

Soil Profile Description

Surface Layer

0 to 4 inches; light brownish gray very
gravelly sandy loam; weak very thin platy
structure; neutral

0 to 2 inches; light reddish brown & white very
gravelly clay loam; weak very fine & fine
subangular blocky structure; mildly alkaline

Subsoil

4 to 19 inches; light brown very gravelly clay
loam & sandy clay loam; massive; neutral

2 to 15 inches; light reddish brown clay;
moderate medium prismatic structure; slightly to
strongly effervescent; moderately alkaline

Substratum

19 to 60 inches; light yellowish brown
extremely gravelly loamy sand & sandy loam;
massive; strongly to violently effervescent;
moderately alkaline

15 to 43 inches; brown, pinkish gray and white
loam & very gravelly loam; massive; violently
effervescent; moderately alkaline

43 inches; rhyolite tuff bedrock (paralithic
contact)

Soil Properties

Restrictive Layer Depth

23 to 60+ inches FB

22 to 60 inches PARA

Effective Rooting
Depth (inches)

20 to 40 inches

20 to 40 inches

Available Water
Capacity

Very low to low (0.7 to 2.5 inches)

Low to moderate (2.3 to 7.5 inches)

Water Retention Class

2 (1.3 to 1.6 inches)

1 (2.6 to 3.1 inches)

Hydrologic Soil Group

B

D

Permeability (in./hr.)

0.2 to 0.6

0.06 to 0.02

Drainage Class

Well drained

Well drained

Runoff

Rapid to Very Rapid

Rapid to Very Rapid

Max Erosion Hazard

Moderate to High

High

Erosion Factor (k)

Surface

0.05 (low)

0.10 (low)

Subsurface

0.15 (low)

0.20 (moderate)

T Value

3

3

Wind Erodability
Group

8

8

186 - Washoe family - Typic Haplargids association (continued)

Soil Manageability
Group
Class

III
3Egpx

III
3Egx

Range Interpretations

Productivity (lb/acre)

400 to 500

400 to 600

Suitability

Summer - Autumn

Summer - Autumn

Most Limiting Factors

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Plant competition; 10% rock outcrop; high erosion hazard; steep slopes

Recreation Interpretations - Limitations for

Camp Areas

Severe: Slope

Severe: Slope

Picnic Areas

Severe: Slope

Severe: Slope

Paths & Trails

Severe: Slope

Severe: Slope

Engineering Interpretations

Unified Class

Surface

GM; GW-GM

GM

Subsoil

SC

ML

Substratum

GP

SM-SC

AASHTO Class

Surface

A-1-a; A-1-b; A-2-4

A-2-6

Subsoil

A-2-6

A-7-6

Substratum

A-1-a; A-1-b; A-2-4

A-2-4; A-4

Suitability for

Sand

Unsuited

Unsuited

Gravel

Unsuited

Unsuited

Topsoil

Poor: Slope; Small stones

Poor: Slope; too clayey; small stones

Roadfill

Poor: Slope

Poor: Slope

Included Areas & Remarks

Included in this map unit are small areas of rhyolitic rock outcrop, on mountainsides and ridges; the Finley family, 15 to 30 percent slopes, in valley fill plains; a soil similar to the Berning family, but cooler, 15 to 30 percent slopes, on ridges; a soil similar to St. Marys, but with a thicker dark surface layer, 15 to 30 percent slopes, in valley fill plains; and the Cath family, 15 to 30 percent slopes, on toeslopes. Included areas make up approximately 30 percent of the map unit area.

187 - Wrango family, 5 to 15 percent slopes

Elevation: 5,660 to 9,600 feet Annual Precipitation: 7 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Wrango family

65 percent

Dissected alluvial fans and terraces

5 to 15 percent

Big Sagebrush (*Artemisia tridentata*); Nevada Ephedra (*Ephedra nevadensis*); Needlegrass (*Stipa* spp.)**Soil Profile Description**

Surface Layer

0 to 3 inches; light brownish gray gravelly loamy sand; weak thin & medium platy structure; mildly alkaline

Subsoil

—

Substratum

3 to 60 inches; brown, pale brown & very pale brown gravelly, very gravelly & extremely gravelly loamy sands; massive; none to strongly effervescent; mildly to moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Effective Rooting Depth (inches)

40 to 60 inches

Available Water Capacity

Low (2.2 to 2.6 inches)

Water Retention Class

3 (0.9 to 1.1 inches)

Hydrologic Soil Group

B

Permeability (in./hr.)

2.0 to 6.0

Drainage Class

Well drained

Runoff

Medium

Max Erosion Hazard

Moderate

Erosion Factor (k)

Surface

0.10 (low)

Subsurface

0.15 (low)

T Value

4

Wind Erodability Group

8

187 - Wrango family (continued)

Soil Manageability
Group
Class

III
3Pex

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 400
Summer - Autumn
Plant competition

Recreation Interpretations - Limitations for

Camp Areas

Picnic Areas

Paths & Trails

5-8% slopes:
Slight
8-15% slopes:
Moderate - slope

3-8% slopes:
Slight
8-15% slopes:
Moderate - slope

Slight

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum
Suitability for
Sand
Gravel
Topsoil
Roadfill

SM
—
SW-SM

A-2-4
—
A-1-a; A-1-b; A-2-4

Fair; Excess fines
Unsuited
Poor: Small stones
Good

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Wrango family, but with a loamy soil profile, 10 to 15 percent slopes, on alluvial fans; a soil similar to the Mackey family, but with a sandy profile, on dissected alluvial fans and terraces; the Midas family, on dissected alluvial fans and terraces; and riverwash, in drainages. Included areas make up approximately 35 percent of the map unit area.

188 - Wrango - Mackey families complex, 3 to 15 percent slopes

Elevation: 5,020 to 7,040 feet Annual Precipitation: 7 to 10 inches

Soil Map Unit Components

Approx Proportion
Landscape Position
Slope
Typical Vegetation

Wrango family

50 percent
Young dissected alluvial fans
3 to 15 percent
Big Sagebrush (*Artemisia tridentata*); Nevada Ephedra (*Ephedra nevadensis*) Needlegrass (*Stipa* spp.)

Mackey family

30 percent
Young dissected alluvial fans
3 to 15 percent
Big Sagebrush (*Artemisia tridentata*); Goldenbush (*Haplopappus* spp.)

Soil Profile Description

Surface Layer

0 to 3 inches; light brownish gray gravelly loamy sand; weak thin & medium platy structure; mildly alkaline

0 to 3 inches; brown gravelly sandy loam; weak fine granular structure; mildly alkaline

Subsoil

—

3 to 42 inches; brown and yellowish brown very gravelly sandy loam; weak medium subangular blocky structure & massive; none to slightly effervescent; mildly to moderately alkaline

Substratum

3 to 60 inches; brown, pale brown, & very pale brown gravelly, very gravelly & extremely gravelly loamy sands; massive; none to strongly effervescent; mildly to moderately alkaline

42 to 60 inches; light brownish gray extremely gravelly loamy sand; massive; strongly effervescent; moderately alkaline

Soil Properties

Restrictive Layer Depth

Greater than 60 inches

Greater than 60 inches

Effective Rooting Depth (inches)

40 to 60 inches

20 to 40 inches

Available Water Capacity

Low (2.2 to 2.6 inches)

Low (2.7 to 3.6 inches)

Water Retention Class

3 (0.9 to 1.1 inches)

2 (1.2 to 1.6 inches)

Hydrologic Soil Group

B

B

Permeability (in./hr.)

2.0 to 6.0

2.0 to 6.0

Drainage Class

Well

Well drained

Runoff

Slow to Medium

Slow to Medium

Max Erosion Hazard

Moderate

High

Erosion Factor (k)

Surface

0.10 (low)

0.05 (low)

Subsurface

0.15 (low)

0.10 (low)

T Value

4

4

Wind Erodability Group

8

3

188 - Wrango - Mackey families complex (continued)

Soil Manageability
Group
Class

III
3Pe

III
3Ep

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 400

300 to 400

Summer - Autumn

Summer - Autumn

Plant competition

Plant competition

Recreation Interpretations - Limitations for

Camp Areas

3-8% slopes:
Slight
8-15% slopes:
Moderate - slope

3-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Picnic Areas

3-8% slopes:
slight
8-15% slopes:
moderate - slope

3-8% slopes:
Moderate - small stones
8-15% slopes:
Moderate - slope; small stones

Paths & Trails

Slight

Moderate: Small stones

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SM
—
SW-SM

SM
SW-SM; SM-SC
GW-GM

AASHTO Class
Surface
Subsoil
Substratum

A-2-4
—
A-1-a; A-1-b; A-2-4

A-1-b; A-2-4
A-1-a; A-1-b; A-2-4
A-1-a; A-1-b; A-2-4

Suitability for
Sand
Gravel
Topsoil
Roadfill

Fair; Excess fines
Unsuited
Poor: Small stones
Good

Unsuited
Unsuited
Poor: Small stones
Good

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Typic Xerorthents soil, but drier, on young dissected alluvial fans; and the Trocken family, on young alluvial fans. Included areas make up approximately 20 percent of the map unit area.

189 - Yuko family - Rock outcrop, granitic association, 15 to 30 percent slopes

Elevation: 6,400 to 8,400 feet Annual Precipitation: 8 inches

Soil Map Unit Components

Approx Proportion

Landscape Position

Slope

Typical Vegetation

Yuko family

50 percent

Mountainsides

15 to 30 percent

Big Sagebrush (*Artemisia tridentata*); Ephedra spp.

Rock outcrop, granitic

20 percent

Ridgetops and convex mountainsides

—

—

Soil Profile Description

Surface Layer

0 to 4 inches; brown very gravelly sandy loam; single grained; moderately alkaline

Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants

Subsoil

4 to 10 inches; yellowish brown & brown gravelly sandy clay loam & sandy loam; moderate medium subangular blocky structure & massive; moderately alkaline

—

Substratum

10 inches; Degraded granodiorite bedrock (paralithic contact)

—

Soil Properties

Restrictive Layer Depth

10 to 18 inches PARA

—

Effective Rooting Depth (inches)

10 to 18 inches

—

Available Water Capacity

Very low (0.9 to 2.0 inches)

—

Water Retention Class

2 to 3 (0.9 to 2.0 inches)

—

Hydrologic Soil Group

D

—

Permeability (in./hr.)

0.2 to 0.6

—

Drainage Class

Moderately well drained

—

Runoff

Rapid

—

Max Erosion Hazard

High

—

Erosion Factor (k)

Surface

0.05 (low)

—

Subsurface

0.10 (low)

—

T Value

1

—

Wind Erodability Group

8

—

189 - Yuko family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EPXd

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 400
Summer - Autumn
Plant competition: 50% shallow soils; 20%
rock outcrop; high erosion hazard

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Slope
Severe: Slope
15-25% slopes:
Moderate - slope; small stones;
25-30% slopes:
Severe - slope

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum

SW-SM; SM-SC
SM
—

—
—
—

AASHTO Class
Surface
Subsoil
Substratum

A-1-a; A-1-b; A-2-4
A-2-4
—

—
—
—

Suitability for
Sand
Gravel
Topsoil
Roadfill

Unsuited
Unsuited
Poor: Slope; small stones; area reclaim
Poor: Slope; area reclaim
15-25% slopes:
Poor - area reclaim
25-30% slopes:
Poor - slope; area reclaim

—
—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of the Trocken family, on mountainsides; a soil similar to the Mascamp family, but warmer, and with soft bedrock, on upper mountainsides; and a soil similar to the Moano family, but with soft bedrock, 9 to 15 percent slopes, on pediment slopes. Included areas make up approximately 30 percent of the map unit area.

190 - Yuko family - Rock outcrop, granitic association, 30 to 60 percent slopes

Elevation: 5,520 to 9,120 feet Annual Precipitation: 8 inches

Soil Map Unit Components

Approx Proportion	Yuko family 40 percent	Rock outcrop, granitic 30 percent
Landscape Position	Mountainsides	Ridge tops and convex mountainsides
Slope	30 to 60 percent	—
Typical Vegetation	Big Sagebrush (<i>Artemisia tridentata</i>); Ephedra spp.	—

Soil Profile Description

Surface Layer	0 to 4 inches; brown very gravelly sandy loam; single grained; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	4 to 10 inches; yellowish brown & brown gravelly sandy clay loam & sandy loam; moderate medium subangular blocky structure & massive; moderately alkaline	—
Substratum	10 inches; Degraded granodiorite bedrock (paralithic contact)	—

Soil Properties

Restrictive Layer Depth	10 to 18 inches PARA	—
Effective Rooting Depth (inches)	10 to 18 inches	—
Available Water Capacity	Very low (0.9 to 2.0 inches)	—
Water Retention Class	2 to 3 (0.9 to 2.0 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.2 to 0.6	—
Drainage Class	Moderately well drained	—
Runoff	Rapid to very rapid	—
Max Erosion Hazard	Very high	—
Erosion Factor (k)		
Surface	0.05 (low)	—
Subsurface	0.10 (low)	—
T Value	1	—
Wind Erodability Group	8	—

190 - Yuko family - Rock outcrop (continued)

Soil Manageability
Group
Class

IV
4EPXdg

IV
—

Range Interpretations

Productivity (lb/acre)
Suitability
Most Limiting Factors

300 to 400
Summer - Autumn
Plant competition: 40% shallow soils; 30%
rock outcrop; very high erosion hazard; steep
slopes

—
—
—

Recreation Interpretations - Limitations for

Camp Areas
Picnic Areas
Paths & Trails

Severe: Slope
Severe: Slope
Severe: Slope

—
—
—

Engineering Interpretations

Unified Class
Surface
Subsoil
Substratum
AASHTO Class
Surface
Subsoil
Substratum
Suitability for
Sand
Gravel
Topsoil
Roadfill

SW-SM; SM-SC
SM
—

—
—
—

A-1-a; A-1-b; A-2-4
A-2-4
—

—
—
—

Unsuited
Unsuited
Poor: Slope; area reclaim; small stones
Poor: Slope; area reclaim

—
—
—
—

Included Areas & Remarks

Included in this map unit are small areas of a soil similar to the Brad family, but warmer, and with soft bedrock, on upper mountainsides; a soil similar to the Slinger family, but warmer, and less than 20 inches to bedrock, on mountainsides; and a soil similar to the Wrango family, but less than 20 inches to soft bedrock, 15 to 30 percent slopes, on pediment slopes. Included areas make up approximately 30 percent of the map unit area.

191 - Yuko family - Rock outcrop, granitic association, 60 to 80 percent slopes

Elevation: 4,000 to 8,400 feet Annual Precipitation: 8 inches

Soil Map Unit Components

Approx Proportion	Yuko family	Rock outcrop, granitic
Landscape Position	40 percent	35 percent
Slope	Mountainsides	Ridgetops and convex mountainsides
Typical Vegetation	60 to 80 percent	—
	Big Sagebrush (<i>Artemisia tridentata</i>); <i>Ephedra</i> spp.	—

Soil Profile Description

Surface Layer	0 to 4 inches; brown very gravelly sandy loam; single grained; moderately alkaline	Rock outcrop consists of contiguous bare bedrock and less than 15 percent inclusions of soil material capable of supporting plants
Subsoil	4 to 10 inches; yellowish brown & brown gravelly sandy clay loam and sandy loam; moderate medium subangular blocky structure & massive; moderately alkaline	—
Substratum	10 inches; Degraded granodiorite bedrock (paralithic contact)	—

Soil Properties

Restrictive Layer Depth	10 to 18 inches PARA	—
Effective Rooting Depth (inches)	10 to 18 inches	—
Available Water Capacity	Very low (0.9 to 2.0 inches)	—
Water Retention Class	2 to 3 (0.9 to 2.0 inches)	—
Hydrologic Soil Group	D	—
Permeability (in./hr.)	0.2 to 0.6	—
Drainage Class	Moderately well drained	—
Runoff	Very rapid	—
Max Erosion Hazard	Very high	—
Erosion Factor (k)		
Surface	0.05 (low)	—
Subsurface	0.10 (low)	—
T Value	1	—
Wind Erodability Group	8	—

191 - Yuko family - Rock outcrop (continued)

Soil Manageability Group Class

IV 4EGPXd	IV —
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Range Interpretations

Productivity (lb/acre)	300 to 400 —
Suitability	Summer - Autumn —
Most Limiting Factors	Plant competition: 40% shallow soils; 25% rock outcrop; very high erosion hazard; very steep slopes —

Recreation Interpretations - Limitations for

Camp Areas	Severe: Slope —
Picnic Areas	Severe: Slope —
Paths & Trails	Severe: Slope —

Engineering Interpretations

Unified Class	
Surface	SW-SM; SM-SC —
Subsoil	SM —
Substratum	— —
AASHTO Class	
Surface	A-1-a; A-1-b; A-2-4 —
Subsoil	A-2-4 —
Substratum	— —
Suitability for	
Sand	Unsuited —
Gravel	Unsuited —
Topsoil	Poor: Slope; area reclaim; small stones —
Roadfill	Poor: Slope; area reclaim —

Included Areas & Remarks

Included in this map unit are small area of a soil similar to the Slinger family, but warmer, and less than 20 inches to bedrock, on mountainsides; a soil similar to the Wrango family, but less than 20 inches to soft bedrock, 30 to 60 percent slopes, on pediment slopes; and a soil similar to the Brad family, but warmer, and with soft bedrock, on upper mountainsides. Included areas make up approximately 25 percent of the map unit area.

Table 2. - Acreage and Proportionate Extent of Map Units

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
101	Abgese-Berent-Mackey families complex, 2 to 15 percent slopes	0.76	5,056
102	Abgese-Berent-Toeja families association, 2 to 30 percent slopes	0.66	4,405
103	Abgese-Berent-Toeja families association, 30 to 70 percent slopes	0.46	3,106
104	Basalt flow	0.02	129
105	Basket-Bondbranch families complex, 15 to 30 percent slopes	1.50	10,060
106	Basket-Bondbranch families-Rock outcrop, metasedimentary complex, 30 to 60 percent slopes	1.11	7,419
107	Basket-Bondbranch families-Rock outcrop, metasedimentary association, 60 to 80 percent slopes	1.01	6,790
108	Basket-Bregar families complex, 15 to 30 percent slopes	0.85	5,671
109	Basket-Packham-Soakpak families association, 30 to 60 percent slopes	1.41	9,466
110	Bearskin-Toeja families complex, 30 to 60 percent slopes	0.62	4,138
111	Berent family, 5 to 15 percent slopes	0.37	2,492
112	Berent family-Rock outcrop, granitic complex, 5 to 30 percent slopes	0.15	1,003
113	Beveridge family-Rock outcrop, limestone complex, 60 to 80 percent slopes	0.64	4,269
114	Blackston family, 15 to 30 percent slopes	0.11	749
115	Bluewing-Trocken families association, 5 to 15 percent slopes	0.54	3,610
116	Brad family-Rock outcrop, granitic complex, 15 to 30 percent slopes	0.86	5,776
117	Bregar-Slinger families-Rock outcrop, metasedimentary complex, 30 to 60 percent slopes	2.80	18,734
118	Cinder Cones	0.10	645
119	Credo family, 15 to 30 percent slopes	0.09	631
120	Credo-Basket families complex, 30 to 60 percent slopes	0.70	4,703

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
121	Finley family, 15 to 30 percent slopes	0.65	4,358
122	Finley-Moano-Mulett families complex, 5 to 40 percent slopes	0.26	1,740
123	Gol family-Durargidic Argixerolls complex, 2 to 15 percent slopes	0.19	1,261
124	Hartig-Dunul families-Rock outcrop, granitic association, 50 to 70 percent slopes	5.44	36,402
125	Hartig family-Rock outcrop, granitic complex, 30 to 60 percent slopes	1.50	10,059
126	Hartig-Packham families association, 30 to 60 percent slopes	1.32	8,859
127	Hymas family-Rock outcrop, limestone association, 15 to 30 percent slopes	0.80	5,366
128	Hymas family-Rock outcrop, limestone association, 30 to 60 percent slopes	2.56	17,140
129	Lithic Camborthids-Rock outcrop, sedimentary association, 2 to 15 percent slopes	0.05	309
130	Lithic Camborthids-Rock outcrop, sedimentary association, 15 to 30 percent slopes	0.07	487
131	Lithic Camborthids-Rock outcrop, sedimentary association, 30 to 60 percent slopes	0.89	5,966
132	Mackey-Unionville families complex, 3 to 15 percent slopes	0.87	5,802
133	Mackey-Washoe families complex, 3 to 15 percent slopes	0.07	482
134	Mascamp-Sumine families complex, 15 to 40 percent slopes	0.27	1,818
135	Mascamp-Sumine families complex, 40 to 60 percent slopes	0.09	619
136	Mascamp-Sumine families-Rock outcrop, metasedimentary complex, 30 to 60 percent slopes	1.28	8,573
137	Merlin-Wenzel families-Rock outcrop, volcanic association, 5 to 60 percent slopes	1.53	10,236
138	Mexispring family-Rock outcrop, granitic association, 15 to 30 percent slopes	0.70	4,711
139	Mexispring family-Rock outcrop, granitic association, 30 to 60 percent slopes	1.42	9,494

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
140	Mexispring family-Rock outcrop, granitic association, 60 to 80 percent slopes	0.66	4,445
141	Midas-Cath-Mackey families complex, 4 to 15 percent slopes	0.99	6,603
142	Midas-Cath-Mackey families complex, 15 to 30 percent slopes	0.35	2,322
143	Moano family-Rock outcrop, sedimentary complex, 60 to 80 percent slopes	0.99	6,638
144	Mulett-Checkett families-Rock outcrop, granitic complex, 60 to 80 percent slopes	0.70	4,703
145	Mulett-Toeja families-Rubbleland association, 15 to 80 percent slopes	0.42	2,804
146	Packham-Slinger families-Rock outcrop, granitic association, 30 to 60 percent slopes	4.31	28,834
147	Packham-Spaa families-Rock outcrop, granitic association, 30 to 60 percent slopes	2.03	13,597
148	Pergelic Cryoborolls-Rock outcrop, metasedimentary association 30 to 60 percent slopes	0.92	6,173
149	Pergelic Cryoborolls-Rubbleland, metasedimentary complex, 30 to 60 percent slopes	0.29	1,947
150	Pergelic Cryoborolls-Soakpak family association, 5 to 70 percent slopes	5.07	33,907
151	Preston family, 1 to 15 percent slopes	0.45	3,005
152	Risue-Abgese-Preston families association, 2 to 15 percent slopes	1.91	12,787
153	Risue-Berent families association, 2 to 15 percent slopes	0.74	4,976
154	Rock outcrop-Rubbleland complex	2.69	17,989
155	Rock outcrop, limestone-Hymas family association, 60 to 80 percent slopes	1.33	8,895
156	Rock outcrop, granitic-Brad-Hartig families complex, 30 to 60 percent slopes	1.44	9,629
157	Rock outcrop, granitic-Brad-Hartig families complex, 60 to 80 percent slopes	1.78	11,940

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
158	Rock outcrop, granitic-Packham family-Rubbleland association, 30 to 80 percent slopes	5.41	36,193
159	Sanpete-Theriot families complex, 5 to 60 percent slopes	4.47	29,890
160	Sanpete-Theriot families-Rock outcrop, limestone association, 60 to 80 percent slopes	1.11	7,410
161	Simpson-Hartig-Bregar families association, 30 to 60 percent slopes	0.04	239
162	Spanel-Trocken families complex, 2 to 15 percent slopes	1.03	6,881
163	Spanel-Trocken families complex, 15 to 30 percent slopes	0.47	3,141
164	Spanel-Trocken families complex, 30 to 60 percent slopes	0.74	4,976
165	St. Marys-Bearskin families-Rock outcrop, volcanic association, 15 to 60 percent slopes	0.65	4,371
166	Supervisor-Bartine families association, 30 to 70 percent slopes	2.05	13,736
167	Supervisor family-Rock outcrop, limestone-Bartine family association, 15 to 60 percent slopes	0.58	3,901
168	Supervisor family-Rock outcrop, granitic-Pergelic Cryoborolls association, 60 to 80 percent slopes	0.77	5,119
169	Supervisor family-Rock outcrop, metasedimentary complex, 5 to 30 percent slopes	0.41	2,767
170	Supervisor family-Rock outcrop, metasedimentary complex, 30 to 60 percent slopes	0.88	5,903
171	Swift Creek family-Rock outcrop, limestone complex, 15 to 30 percent slopes	0.19	1,295
172	Theriot family-Rock outcrop, limestone association, 15 to 30 percent slopes	0.20	1,362
173	Theriot family-Rock outcrop, limestone association, 30 to 60 percent slopes	0.87	5,821
174	Theriot family-Rock outcrop, limestone association, 60 to 80 percent slopes	1.37	9,193

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
175	Toeja-Berning-Simpson families association, 15 to 60 percent slopes	1.37	9,155
176	Toeja-Merlin families complex, 30 to 60 percent slopes	0.05	302
177	Toeja-Merlin families-Rock outcrop, volcanic complex, 5 to 40 percent slopes	0.84	5,633
178	Trocken-Bluewing families complex, 15 to 30 percent slopes	0.17	1,138
179	Trocken family-Rock outcrop, metasedimentary complex, 60 to 80 percent slopes	1.55	10,362
180	Trocken-Midas families association, 5 to 60 percent slopes	0.56	3,720
181	Tweedy-Abgese families association, 1 to 15 percent slopes	1.07	7,117
182	Typic Haplargids-Vipont-Spaa families complex, 5 to 70 percent slopes	1.00	6,691
183	Typic Xerorthents, 2 to 15 percent slopes	0.47	3,148
184	Unionville-Risue families-Rock outcrop, volcanic complex, 5 to 30 percent slopes	1.31	8,771
185	Washoe-Checkett-Mulett families association, 30 to 60 percent slopes	4.68	31,338
186	Washoe family-Typic Haplargids association, 30 to 60 percent slopes	0.50	3,357
187	Wrango family, 5 to 15 percent slopes	0.59	3,953
188	Wrango-Mackey families complex, 3 to 15 percent slopes	0.46	3,049
189	Yuko family-Rock outcrop, granitic association, 15 to 30 percent slopes	0.50	3,369
190	Yuko family-Rock outcrop, granitic association, 30 to 60 percent slopes	1.35	9,035
191	Yuko family-Rock outcrop, granitic association, 60 to 80 percent slopes	0.50	3,351
TOTALS		100.00	669,420

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. This survey was mapped to the family level. In table 3, the soils of the survey area are listed alphabetically and are classified according to the system. In table 4, there are listed for each soil those map units in which the soil occurs as a major component. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Alfisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Xeralf (Xer meaning dry, plus alf, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haploxeralf (Hapl, meaning minimal horizonation, plus xeralf, the suborder of the Alfisols that have a xeric moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Lithic identifies the subgroup that has hard parent rock within 50 centimeters of the surface. An example is Lithic Haploxeralfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is loamy, mixed, thermic Lithic Haploxeralfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. Since the soils in this soil survey area were classified only to the family level, the series is not used in this report.

TABLE 3. - Classification by Soil Name

Family or Subgroup	Taxonomic Classification
Abgese	Xerollic Haplargids, fine-loamy, mixed, mesic
Bartine	Typic Cryoborolls, loamy-skeletal, carbonatic
Basket	Xerollic Haplargids, loamy-skeletal, mixed, frigid
Bearskin	Lithic Argixerolls, loamy, mixed, frigid
Berent	Xeric Torripsamments, mixed, mesic
Berning	Xerollic Haplargids, clayey-skeletal, montmorillonitic, mesic
Beveridge	Lithic Torriorthents, loamy-skeletal, carbonatic, frigid
Blackston	Typic Calciorthids, loamy-skeletal, mixed, mesic
Bluewing	Typic Torriorthents, sandy-skeletal, mixed, mesic
Bondranch	Lithic Xerollic Camborthids, loamy, mixed, frigid
Brad	Lithic Haploxerolls, sandy-skeletal, mixed, frigid
Bregar	Lithic Xerollic Haplargids, loamy-skeletal, mixed, frigid
Cath	Durixerollic Haplargids, fine-loamy, mixed, mesic
Checkett	Lithic Xerollic Haplargids, loamy-skeletal, mixed, mesic
Credo	Xerollic Haplargids, fine-loamy, mixed, frigid
Dunul	Typic Torriorthents, sandy-skeletal, mixed, frigid
Durargidic Argixerolls	Coarse-loamy, mixed, frigid
Finley	Xerollic Camborthids, loamy-skeletal, mixed, mesic
Gol	Xerollic Haplargids, loamy, mixed, frigid, shallow
Hartig	Aridic Haploxerolls, loamy-skeletal, mixed, frigid
Hymas	Lithic Haploxerolls, loamy-skeletal, carbonatic, frigid
Lithic Camborthids	Loamy-skeletal, mixed, mesic
Mackey	Xerollic Camborthids, loamy-skeletal, mixed, mesic
Mascamp	Lithic Argixerolls, loamy-skeletal, mixed, frigid

Family or Subgroup	Taxonomic Classification
Merlin	Lithic Argixerolls, clayey, montmorillonitic, frigid
Mexispring	Typic Torriorthents, loamy-skeletal, mixed, nonacid, mesic, shallow
Midas	Duric Camborthids, loamy-skeletal, mixed, mesic
Moano	Lithic Torriorthents, loamy, mixed, nonacid, mesic
Mulett	Lithic Xerollic Camborthids, loamy-skeletal, mixed, mesic
Packham	Xerollic Camborthids, loamy-skeletal, mixed, frigid
Pergelic Cryoborolls	Loamy-skeletal, mixed
Preston	Typic Xeropsamments, mixed, mesic
Risue	Abruptic Durargids, clayey, montmorillonitic, mesic, shallow
Sanpete	Xerollic Calciorthids, loamy-skeletal, carbonatic, mesic
Simpson	Aridic Argixerolls, fine, montmorillonitic, mesic
Slinger	Xeric Torriorthents, loamy-skeletal, mixed (calcareous), frigid
Soakpak	Pergelic Cryochrepts, loamy-skeletal, mixed
Spaa	Lithic Haploxerolls, loamy, mixed, frigid
Spapel	Typic Durargids, loamy, mixed, mesic, shallow
St. Marys	Typic Haploxerolls, loamy-skeletal, mixed, frigid
Sumine	Aridic Argixerolls, loamy-skeletal, mixed, frigid
Supervisor	Typic Cryoborolls, loamy-skeletal, mixed
Swift Creek	Typic Cryorthents, loamy-skeletal, carbonatic
Theriot	Lithic Torriorthents, loamy-skeletal, carbonatic, mesic
Toeja	Aridic Argixerolls, fine-loamy, mixed, frigid
Trocken	Typic Torriorthents, loamy-skeletal, mixed (calcareous), mesic
Tweedy	Typic Argixerolls, fine-loamy, mixed, mesic
Typic Haplargids	Fine, montmorillonitic, frigid
Typic Xerorthents	Coarse-loamy, mixed, nonacid, mesic

Family or Subgroup	Taxonomic Classification
Unionville	Typic Camborthids, coarse-loamy, mixed, mesic
Vipont	Pachic Argixerolls, loamy-skeletal, mixed, frigid
Washoe	Xerollic Haplargids, loamy-skeletal, mixed, mesic
Wenzel	Typic Argixerolls, clayey-skeletal, mixed, frigid
Wrango	Xeric Torriorthents, sandy-skeletal, mixed, mesic
Yuko	Xerollic Haplargids, loamy, mixed, mesic, shallow

TABLE 4. - Classification of the Soils into Higher Categories

Representative Series	Order	Subgroup	Family
Abgese family	Aridisols	Xerollic Haplargids	Fine-loamy, mixed, mesic
Bartine family	Mollisols	Typic Cryoborolls	Loamy-skeletal, carbonatic
Basket family	Aridisols	Xerollic Haplargids	Loamy-skeletal, mixed, frigid
Bearskin family	Mollisols	Lithic Argixerolls	Loamy, mixed, frigid
Berent family	Entisols	Xeric Torripsamments	Mixed, mesic
Berning family	Aridisols	Xerollic Haplargids	Clayey-skeletal, montmorillonitic, mesic
Beveridge family	Entisols	Lithic Torriorthents	Loamy-skeletal, carbonatic, frigid
Blackston family	Aridisols	Typic Calciorhids	Loamy-skeletal, mixed, mesic
Bluewing family	Entisols	Typic Torriorthents	Sandy-skeletal, mixed, mesic
Bondranch family	Aridisols	Lithic Xerollic Camborhids	Loamy, mixed, frigid
Brad family	Mollisols	Lithic Haploxerolls	Sandy-skeletal, mixed, frigid
Bregar family	Aridisols	Lithic Xerollic Haplargids	Loamy-skeletal, mixed, frigid
Cath family	Aridisols	Durixerollic Haplargids	Fine-loamy, mixed, mesic
Checkett family	Aridisols	Lithic Xerollic Haplargids	Loamy-skeletal, mixed, mesic
Credo family	Aridisols	Xerollic Haplargids	Fine-loamy, mixed, frigid
Dunul family	Entisols	Typic Torriorthents	Sandy-skeletal, mixed, frigid
Finley family	Aridisols	Xerollic Camborhids	Loamy-skeletal, mixed, mesic
Gol family	Aridisols	Xerollic Haplargids	Loamy, mixed, frigid, shallow
Hartig family	Mollisols	Aridic Haploxerolls	Loamy-skeletal, mixed, frigid
Hymas family	Mollisols	Lithic Haploxerolls	Loamy-skeletal, carbonatic, frigid
Mackey family	Aridisols	Xerollic Camborhids	Loamy-skeletal, mixed, mesic
Mascamp family	Mollisols	Lithic Argixerolls	Loamy-skeletal, mixed, frigid
Merlin family	Mollisols	Lithic Argixerolls	Clayey, montmorillonitic, frigid
Mexispring family	Entisols	Typic Torriorthents	Loamy-skeletal, mixed, nonacid, mesic, shallow
Midas family	Aridisols	Duric Camborhids	Loamy-skeletal, mixed, mesic
Moano family	Entisols	Lithic Torriorthents	Loamy, mixed, nonacid, mesic
Mulett family	Aridisols	Lithic Xerollic Camborhids	Loamy-skeletal, mixed, mesic
Packham family	Aridisols	Xerollic Camborhids	Loamy-skeletal, mixed, frigid

Representative Series	Order	Subgroup	Family
Preston family	Entisols	Typic Xeropsamments	Mixed, mesic
Risue family	Aridisols	Abruptic Durargids	Clayey, montmorillonitic, mesic, shallow
Sanpete family	Aridisols	Xerollic Calciorthids	Loamy-skeletal, carbonatic, mesic
Simpson family	Mollisols	Aridic Argixerolls	Fine, montmorillonitic, mesic
Slinger family	Entisols ¹	Xeric Torriorthents	Loamy-skeletal, mixed (calcareous), frigid
Soakpak family	Inceptisols	Pergelic Cryochrepts	Loamy-skeletal, mixed
Spaa family	Mollisols	Lithic Haploxerolls	Loamy, mixed, frigid
Spanel family	Aridisols	Typic Durargids	Loamy, mixed, mesic, shallow
St. Marys family	Mollisols	Typic Haploxerolls	Loamy-skeletal, mixed, frigid
Sumine family	Mollisols	Aridic Argixerolls	Loamy-skeletal, mixed, frigid
Supervisor family	Mollisols	Typic Cryoborolls	Loamy-skeletal, mixed
Swift Creek family	Entisols	Typic Cryorthents	Loamy-skeletal, carbonatic
Theriot family	Entisols	Lithic Torriorthents	Loamy-skeletal, carbonatic, mesic
Toeja family	Mollisols	Aridic Argixerolls	Fine-loamy, mixed, frigid
Trocken family	Entisols	Typic Torriorthents	Loamy-skeletal, mixed (calcareous), mesic
Tweedy family	Mollisols	Typic Argixerolls	Fine-loamy, mixed, mesic
Unionville	Aridisols	Typic Camborthids	Coarse-loamy, mixed, mesic
Vipont family	Mollisols	Pachic Arigixerolls	Loamy-skeletal, mixed, frigid
Washoe family	Aridisols	Xerollic Haplargids	Loamy-skeletal, mixed, mesic
Wenzel family	Mollisols	Typic Argixerolls	Clayey-skeletal, mixed frigid
Wrango family	Entisols	Xeric Torriorthents	Sandy-skeletal, mixed, mesic
Yuko family	Aridisols	Xerollic Haplargids	Loamy, mixed, mesic, shallow
*	Mollisols	Durargidic Argixerolls	Coarse-loamy, mixed, frigid
*	Aridisols	Lithic Camborthids	Loamy-skeletal, mixed, mesic
*	Mollisols	Pergelic Cryoborolls	Loamy-skeletal, mixed
*	Aridisols	Typic Haplargids	Fine, montmorillonitic, frigid
*	Entisols	Typic Xerorthents	Coarse-loamy, mixed, nonacid, mesic

*Taxonomic Units without representative families.

TABLE 5. - Classification by Taxonomic Category

Order	Suborder	Great Group	Subgroup	Family	Soil Name	Modal Number		
Aridisols	Argids	Durargids	Typic Durargids	loamy, mixed, mesic, shallow	Spanel	426-3		
			Abruptic Durargids	clayey, montmorillonitic, mesic, shallow	Risue	09-105-P68		
		Haplargids	Typic Haplargids	fine, montmorillonitic, frigid	Unnamed	09-15-1		
			Durixerollic Haplargids	fine-loamy, mixed, mesic	Cath	507-3		
			Lithic Xerollic Haplargids	loamy-skeletal, mixed, frigid loamy-skeletal, mixed, mesic	Bregar	04-71-1		
					Checkett	516-2		
			Xerollic Haplargids	loamy-skeletal, mixed, frigid loamy-skeletal, mixed, mesic clayey-skeletal, montmorillonitic, mesic loamy, mixed, frigid, shallow loamy, mixed, mesic, shallow fine-loamy, mixed, frigid fine-loamy, mixed, mesic	Basket Washoe Berning Gol Yuko Credo Abgese	11-231-P79 C11-233-2A 01-39-3 A521-15 C11-239-1 973-105-P70 A516-4d		
		Orthids	Calciorthids	Typic Calciorthids	loamy-skeletal, mixed, mesic	Blackston	11-233-P85	
				Xerollic Calciorthids	loamy-skeletal, carbonatic, mesic	Sanpete	430-4	
			Camborthids	Typic Camborthids	coarse-loamy, mixed, mesic	Unionville	503-1	
				Duric Camborthids	loamy-skeletal, mixed, mesic	Midas	512-1	
				Lithic Camborthids	loamy-skeletal, mixed, mesic	Unnamed	429-5	
				Lithic Xerollic Camborthids	loamy-skeletal, mixed, mesic loamy, mixed, frigid	Mulett	01-143-2	
	Bondranch					11-233-P78		
	Xerollic Camborthids			loamy-skeletal, mixed, frigid loamy-skeletal, mixed, mesic loamy-skeletal, mixed, mesic	Packham Finley Mackey	11-233-P83 425-2B 502-1		
	Entisols		Orthents	Cryorthents	Typic Cryorthents	loamy-skeletal, carbonatic	Swift Creek	973-7-2
				Torriorthents	Typic Torriorthents	sandy-skeletal, mixed, frigid sandy-skeletal, mixed, mesic loamy-skeletal, mixed, nonacid, mesic, shallow loamy-skeletal, mixed (calcareous), mesic	Dunul	9-11-7
		Bluewing					427-1	
					Mexispring	424-3		
					Trocken	504-3		

Order	Suborder	Great Group	Subgroup	Family	Soil Name	Modal Number
			Lithic Torriorthents	loamy-skeletal, carbonatic, frigid loamy-skeletal, carbonatic, mesic loamy, mixed, nonacid, mesic	Beveridge Theriot Moano	09-11-4 512-4 423-2
			Xeric Torriorthents	sandy-skeletal, mixed, mesic loamy-skeletal, mixed (calcareous), frigid	Wrango Slinger	9-13-5 01-39-7
		Xerorthents	Typic Xerorthents	coarse-loamy, mixed, nonacid, mesic	Unnamed	09-116-P72
	Psamments	Torripsamments	Xeric Torripsamments	mixed, mesic	Berent	09-69-P64
		Xeropsamments	Typic Xeropsamments	mixed, mesic	Preston	09-116-P71
Inceptisols	Ochrepts	Cryochrepts	Pergelic Cryochrepts	loamy-skeletal, mixed	Soakpak	01-35-1
Mollisols	Borolls	Cryoborolls	Typic Cryoborolls	loamy-skeletal, carbonatic loamy-skeletal, mixed	Bartine Supervisor	11-229-1 473-71-P76
			Pergelic Cryoborolls	loamy-skeletal, mixed	Unnamed	09-9-1
	Xerolls	Argixerolls	Typic Argixerolls	clayey-skeletal, mixed, frigid fine-loamy, mixed, mesic	Wenzel Tweedy	11-229-5 09-114-P74
			Aridic Argixerolls	loamy-skeletal, mixed, frigid fine-loamy, mixed, frigid fine, montmorillonitic, mesic	Sumine Toeja Simpson	518-1 01-39-5 01-39-2
			Durargidic Argixerolls	coarse-loamy, mixed, frigid	Unnamed	A520-25
			Lithic Argixerolls	loamy-skeletal, mixed, frigid loamy, mixed, frigid clayey, montmorillonitic, frigid	Mascamp Bearskin Merlin	523-4 09-69-P63 01-143-4
			Pachic Argixerolls	loamy-skeletal, mixed, frigid	Vipont	01-39-1
		Haploxerolls	Typic Haploxerolls	loamy-skeletal, mixed, frigid	St. Marys	10-04-P62
			Aridic Haploxerolls	loamy-skeletal, mixed, frigid	Hartig	11-229-4
			Lithic Haploxerolls	sandy-skeletal, mixed, frigid loamy-skeletal, carbonatic, frigid loamy, mixed, frigid	Brad Hymas Spaa	A522-15 521-2 01-39-4

TABLE 6. - Soil Components and Named Inclusions in Map Units

Soil Name	Named Primary Component	Named Inclusion
Abgese family	101, 102, 103, 152, 181	101, 102, 111, 132, 152
Bartine family	166, 167	127, 128, 147, 155, 169, 170
Basket family	105, 106, 107, 108, 109, 120	105, 107
Bearskin family	110, 165	136, 137
Berent family	101, 102, 103, 111, 112, 153	101, 102, 111, 183, 184
Berning family	175	101
Beveridge family	113	--
Blackston family	114	129, 130, 131, 172, 173, 174
Bluewing family	115, 178	132, 162, 163, 164
Bondranch family	105, 106, 107	105, 107, 184
Brad family	116, 156, 157	156
Bregar family	108, 117, 161	106, 117
Cath family	141, 142	141, 186
Checkett family	144, 185	122
Credo family	119, 120	--
Dunul family	124	--
Durargidic Argixerolls	123	151
Finley family	121, 122	106, 143, 163, 164, 185, 186
Gol family	123	--
Hartig family	124, 125, 126, 156, 157, 161	106, 108, 125, 137, 156, 167
Hymas family	127, 128, 155	127, 128, 155
Lithic Camborthids	129, 130, 131	178
Mackey family	101, 132, 133, 141, 142, 188	101, 114, 141
Mascamp family	134, 135, 136	--
Merlin family	137, 176, 177	--
Mexispring family	138, 139, 140	--
Midas family	141, 142, 180	101, 141, 153, 187
Moano family	122, 143	185

Soil Name	Named Primary Component	Named Inclusion
Mulett family	122, 144, 145, 185	106, 107, 160
Packham family	109, 126, 146, 147, 158	124, 167, 169, 170
Pergelic Cryoborolls	148, 149, 150, 168	150
Preston family	151, 152	181
Risue family	152, 153, 184	--
Sanpete family	159, 160	114
Simpson family	161, 175	--
Slinger family	117, 146	117, 124, 158, 178
Soakpak family	109, 150	124, 148, 150, 168
Spaa family	147, 182	119, 176
Spanel family	162, 163, 164	--
St. Marys family	165	136, 177
Sumine family	134, 135, 136	116, 145, 156, 157, 175
Supervisor family	166, 167, 168, 169, 170	156, 157, 171
Swift Creek family	171	149, 166, 171
Theriot family	159, 160, 172, 173, 174	159, 160
Toeja family	102, 103, 110, 145, 175, 176, 177	136, 175
Trocken family	115, 162, 163, 164, 178, 179, 180	115, 129, 130, 131, 134, 159, 179, 188, 189
Tweedy family	181	--
Typic Haplargids	182, 186	123, 161, 182
Typic Xerorthents	183	183
Unionville family	132, 184	183
Vipont family	182	182
Washoe family	133, 185, 186	122, 132, 141, 142, 161
Wenzel family	137	125, 134, 136, 165
Wrango family	187, 188	112, 122, 133, 151, 181, 185
Yuko family	189, 190, 191	--

Taxonomic Unit Descriptions

In this section, each soil family or higher category recognized in the survey area is described. The descriptions are arranged in alphabetical order. Characteristics of the soil and the material in which it formed are identified for each family. The pedon, a small three-dimensional area of the soil that is typical of the soil profile in the survey area, is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual.

Many of the technical terms used in the descriptions are defined in *Soil Taxonomy*. The soil moisture conditions at the time soil colors were described are given. Following the pedon description is the range of important characteristics of the soils in each family. The map units of each soil family are described in the section "Detailed Soil Map Units".

Abgese Family

The Abgese family consists of moderately deep to deep, well drained soils forming in alluvium from granitic rocks, or colluvium from basalt rock. These soils are on alluvial fans or on sideslopes of basalt flows. Slope is 2 to 70 percent. Elevation is 5,400 to 8,300 feet. The mean annual precipitation is about 10 inches and the mean annual air temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a southeast-facing alluvial fan, under Big Sagebrush and Pinyon Pine, at an elevation of 8,200 feet. Slope is 5 percent. When described (5/16/80), the soil was moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 5 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 8 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

B2t - 5 to 11 inches; yellowish brown (10YR 5/4) sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and interstitial pores; common moderately thick clay films lining pores and bridging mineral grains; 5 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

B3 - 11 to 16 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 33 percent gravel; mildly alkaline (pH 7.8); gradual smooth boundary.

C1 - 16 to 60 inches; yellowish brown (10YR 5/4)

very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 35 percent gravel; mildly alkaline (pH 7.8).

The surface is covered with 2 percent cobbles.

Type Location: About 1/3 mile south of the apparent center of Section 31, T.10S., R.36E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from early April to mid October. The textural control section includes either all of the argillic or the upper 20 inches of the argillic. It is heavy sandy loam or sandy clay loam, with 18 to 31 percent clay. Rock fragments are 0 to 5 percent by volume.

The A horizon has dry color of 10YR 5/3 or 6/2; moist color is 10YR 3/3 or 4/2. It is sandy loam or loamy sand with 3 to 12 percent clay. Rock fragments are 8 to 10 percent gravel, 0 to 20 percent cobbles and 0 to 30 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The B2t horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 4/3. It is heavy sandy loam or sandy clay loam with 18 to 31 percent clay. Rock fragments are 0 to 5 percent gravel by volume. Reaction is slightly acid to mildly alkaline (pH 6.4 to 7.8).

The C horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy clay loam, sandy loam or loamy sand with 4 to 26 percent clay. Rock fragments are 10 to 35 percent gravel by volume. Reaction is slightly acid to mildly alkaline (pH 6.3 to 7.8).

Bartine Family

The Bartine family consists of deep, well drained soils forming in residuum and colluvium from limestone and dolomite. These soils are on mountainsides. Slope is 30 to 70 percent. Elevation is 8,800 to 11,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy-skeletal, carbonatic Typic Cryoborolls

Typical Pedon: The representative profile for this soil is on a mountainside, under Bristlecone Pine and Limberpine, at an elevation of 9,160 feet. Slope is 70 percent. When described (6/23/80), the soil was dry in the upper 5 inches, and slightly moist in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 5 inches; dark grayish brown (10YR 4/2) cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, few fine and common coarse roots; many very fine and few fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12 - 5 to 11 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine, and few medium roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 15 percent gravel and 20 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B21 - 11 to 20 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel and 30 percent cobbles; mildly alkaline (pH 7.8); gradual wavy boundary.

B22ca - 20 to 27 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable,

slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; violently effervescent lime coatings on the undersides of rock fragments; violently effervescent, disseminated lime; 20 percent gravel, 30 percent cobbles and 10 percent stones; moderately alkaline (pH 8.0); gradual wavy boundary.

B23ca - 27 to 42 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; violently effervescent lime coatings and pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 20 percent gravel, 40 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 42 inches; hard, fractured dolomite.

The soil surface is covered with 10 percent gravel, 30 percent cobbles and 5 percent stones.

Type Location: About 3.6 miles east on Wyman Canyon road, from its intersection with the Ancient Bristlecone road, then 900 feet upslope, on the south side of the road; about 0.2 miles east of the northwest corner of Section 16, T.6S., R.35E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 40 to 60 inches. The mean annual soil temperature at 20 inches is about 37°F, and the mean summer temperature is 58°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts from mid-April to late September, and is usually moist in some or all parts the rest of the year. The 10 to 40 inch textural control section is sandy loam or loam, with 7 to 14 percent clay. Rock fragments are 30 to 80 percent by volume, and average about 61 percent. They are limestone rock fragments. The soil is mildly to moderately alkaline (pH 7.5 to 8.0) and slightly to violently effervescent throughout. Alkalinity and effervescence increases with increasing depth. Depth to secondary carbonates, in the form of soft coatings and pendants on the undersides of the rock fragments, is 12 to 20 inches.

The A horizon has dry color of 10YR 4/2, 4/3 or 5/3; moist color is 10YR 3/3. It is sandy loam, with 7 to 10 percent clay. Rock fragments are 10 to 15 percent gravel and 10 to 20 percent cobbles by volume. It is slightly effervescent and mildly alkaline (pH 7.5 to 7.8).

The B horizon has dry color of 10YR 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam or loam, with 11 to 14 percent clay. Rock fragments are 10 to 25 percent gravel, 30 to 45 percent cobbles and 0 to 15 percent stones by volume. It is slightly to violently effervescent and mildly to moderately alkaline (pH 7.8 to 8.0).

Basket Family

The Basket family consists of deep and moderately deep, well drained soils forming in colluvium and residuum weathered from mixed metasedimentary rocks. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 6,000 to 9,700 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy - skeletal, mixed, frigid Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 8,400 feet. Slope is 28 percent. When described (10/25/78), the soil was dry in the upper 37 inches and slightly moist in the remainder of the profile. (Colors are for dry soil unless otherwise noted; colors were taken as rubbed.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) very channery fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; soft, very friable, nonsticky and nonplastic; few medium and fine and common very fine roots; many very fine and fine tubular pores; 40 percent gravel and 20 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A12 - 2 to 5 inches; pale brown (10YR 6/3) very channery loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure, parting to weak very fine subangular blocky; soft, friable, slightly sticky and slightly plastic; few medium and fine, and common very fine roots; many very fine and fine tubular pores; 40 percent gravel and 20 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A13 - 5 to 15 inches; pale brown (10YR 6/3) very channery loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; soft, friable, slightly sticky and slightly plastic; few medium and fine, and common very fine roots; few very fine, fine and medium tubular and interstitial pores; 40 percent gravel and 5 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A3 - 15 to 28 inches; pale brown (10YR 6/3) extremely

channery loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine and common very fine roots; common very fine tubular and interstitial pores; 70 percent gravel, 10 percent cobbles and 2 percent stones; neutral (pH 7.0); clear wavy boundary.

B1t - 28 to 37 inches; pale brown (10YR 6/3) extremely channery loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few medium, fine and very fine roots; common very fine tubular and interstitial pores; few thin clay films bridging mineral sand grains; 70 percent gravel, 10 percent cobbles and 2 percent stones; neutral (pH 7.0); clear smooth boundary.

B21t - 37 to 48 inches; light yellowish brown (10YR 6/4) extremely channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate very fine angular blocky structure; slightly hard, firm, sticky and plastic; few medium, fine and very fine roots; common very fine tubular pores; common moderately thick clay films on ped faces and in pores; 65 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

B22t - 48 to 57 inches; light yellowish brown (10YR 6/4) extremely channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate very fine angular blocky structure; hard, firm, sticky and plastic; few medium, fine and very fine roots; common very fine tubular pores; common moderately thick clay films on ped faces and in pores; 65 percent gravel and 5 percent cobbles; neutral (pH 7.0); abrupt wavy boundary.

R - 57 inches; hard metasedimentary rock.

The soil surface is covered with 78 percent gravel and cobbles. These fragments are channery (thin and flat, and less than 6 inches long).

Type Location: About 4.1 miles north on the Bristlecone road, from its intersection with Westgard road, then 0.3 miles west on Grandview Mine road and about 500 feet north of the road; the apparent center of the southwest quarter of Section 13, T.7S., R.34E., MDBM,

Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 25 to 57 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The textural control section is the argillic horizon. It is clay loam, sandy clay loam or silty clay loam, with 31 to 33 percent clay, and a weighted average of 32 percent. Rock fragments range from 40 to 70 percent, and average about 68 percent by volume.

Some pedons lack an A13, A3 or a B1t horizon. Some pedons include a buried A1 and B2t. Other pedons have

O horizons up to one-half inch thick.

The A horizon has dry color of 10YR 6/3; moist color is 10YR 3/2, 4/2, 3/3 or 4/3. It is loam, fine sandy loam or sand, with 7 to 26 percent clay. Rock fragments are 8 to 60 percent gravel, 5 to 20 percent cobbles and 0 to 20 percent stones by volume. It is neutral to moderately alkaline (pH 6.9 to 8.0).

The B2t horizon has dry color of 10YR 5/4 or 6/4; moist color is 10YR 4/4 or 7.5YR 4/4. It is clay loam, sandy clay loam or silty clay loam, with 31 to 33 percent clay. Rock fragments are 40 to 50 percent gravel, 30 to 65 percent cobbles and 0 to 5 percent stones by volume. It is neutral to strongly alkaline (pH 6.7 to 9.0).

Bearskin Family

The Bearskin family consists of shallow, well drained soils forming in residuum and colluvium from basalt and slate. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,800 to 8,200 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Argixerolls

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 7,520 feet. Slope is 32 percent. When described (8/24/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

O2 - 1 to 0 inches; highly decomposed pine needles, cones and twigs.

A1 - 0 to 2 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (7.5YR 3/2) moist; weak very fine and fine subangular blocky structure, parting to weak very fine and fine granular; soft, friable, nonsticky and slightly plastic; many very fine and fine roots; many medium interstitial pores; 20 percent gravel, 21 percent cobbles and 5 percent stones; neutral (pH 6.6); abrupt smooth boundary.

B1 - 2 to 5 inches; brown (10YR 5/3) cobbly sandy clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common fine tubular pores; 21 percent cobbles and 5 percent stones; neutral (pH 6.8); clear wavy boundary.

B21t - 5 to 11 inches; brown (10YR 4/3) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure, parting to moderate fine subangular blocky; slightly hard, firm, sticky and slightly plastic; few very fine, fine and medium roots; common very fine, fine and medium tubular pores; few thin clay films bridging

mineral sand grains; neutral (pH 6.8); abrupt wavy boundary.

B22t - 11 to 17 inches; brown (7.5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; strong coarse subangular blocky structure, parting to strong fine and medium subangular blocky; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and common fine tubular pores; common thin clay films on ped faces, and few thin clay films in pores; neutral (pH 6.8); abrupt wavy boundary.

R - 17 inches; hard basalt bedrock.

The soil surface is covered with 20 percent gravel, 20 percent cobbles and 5 percent stones.

Type Location: About 110 feet west and 80 feet south of the northeast corner of Section 4, T.1N., R.31E., MDBM, Glass Mountain NE Quadrangle.

Range in Characteristic: Depth to the lithic contact ranges from 13 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 2 to 17 inches. It is usually dry in all parts from mid April to late September and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in pedons deeper than 14 inches and is all of the soil in shallower pedons. The texture is silt loam or sandy clay loam with 10 to 34 percent clay, and an average of about 32 percent. Rock fragments are 0 to 21 percent by volume.

Some pedons lack O horizons.

The O horizon is up to 1 inch thick.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 7.5YR 3/2. It is sandy loam or silt loam with 10 to 18 percent clay. Rock fragments are 10 to 50 percent gravel and 0 to 21 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 6.6 to 8.0)

The B1 horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 7.5YR 3/2. It is silt loam or sandy clay loam with 14 to 25 percent clay. Rock fragments are 0 to 16 percent gravel, 0 to 21 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

The B2t horizon has dry color of 10YR 4/3 or 5/3, or 7.5YR 4/4; moist color is 10YR 3/3, or 7.5YR 3/2 or 5YR 3/4. It is silt loam or sandy clay loam with 16 to 34 percent clay. Rock fragments are 0 to 16 percent gravel and 0 to 5 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

Berent Family

The Berent family consists of deep, well drained soils forming in alluvium and eolian deposits from mixed rocks. These soils are in basin fans, alluvial bottoms and on stabilized dunes. Slope is 2 to 30 percent. Elevation is 5,100 to 7,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Mixed, mesic Xeric Torripsamments

Typical Pedon: The representative profile for this soil is in a north-facing basin fan, under Big Sagebrush and Antelope Bitterbrush, at an elevation of 6,520 feet. Slope is 7 percent. When described (10/19/81), the soil was slightly moist in the upper 6 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 6 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

A12 - 6 to 13 inches; brown (10YR 5/3) gravelly medium sand, dark brown (10YR 3/3) moist; massive; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 17 percent gravel; moderately alkaline (pH 8.0); gradual wavy boundary.

C1 - 13 to 22 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C2 - 22 to 44 inches; light yellowish brown (10YR 6/4) medium sand, brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few fine

roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C3 - 44 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 16 percent gravel; moderately alkaline (pH 8.0).

The surface is covered with 15 percent gravel.

Type Location: About 1.6 miles west on Wyman Canyon Road, from its intersection with Highway 3A (Westgard Pass Road), then 2.55 miles south on the south fork of the road, then 0.5 mile south on the south fork of the road, and about 25 feet east of the road; about 1,320 feet east and 360 feet south of the northwest corner of Section 28, T.6S., R.36E., MDBM, Blanco Mountain NE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control is 13 to 60 inches. It is usually dry in all parts from early April to mid October. The 10 to 40 inch control section is loamy fine sand, loamy coarse sand, loamy sand, medium sand or sand, with 0 to 17 percent gravel by volume.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is medium sand, fine sand, loamy coarse sand or loamy sand, with 5 to 20 percent gravel by volume. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The C horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3, 4/3, 4/4 or 5/3. It is sand, coarse sand, medium sand, loamy coarse sand, loamy sand, loamy fine sand and sandy loam, with less than 5 percent clay, and 0 to 17 percent gravel by volume. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Berning Family

The Berning family consists of moderately deep, well drained soils forming in colluvium and alluvium from rhyolitic and granitic rocks. These soils are on mountainsides and old alluvial fans. Slope is 30 to 60 percent. Elevation is 6,800 to 8,500 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is 48°F.

Taxonomic Class: Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,440 feet. Slope is 50 percent. When described (9/29/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; light brownish gray (10YR 6/2) extremely stony loamy sand, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 40 percent gravel, 20 percent cobbles and 15 percent stones; neutral (pH 7.0); clear wavy boundary.

B1t - 4 to 12 inches; pale brown (10YR 6/3) very stony loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine and fine, and common medium and coarse roots; many very fine and fine interstitial pores; few thin clay films bridging mineral sandgrains and in pores; 30 percent gravel, 20 percent cobbles and 15 percent stones; neutral (pH 7.0); clear irregular boundary.

B2t - 12 to 24 inches; reddish yellow (5YR 6/6) very cobbly clay, yellowish red (5YR 4/6) moist; massive; hard, friable, very sticky and very plastic; few fine and medium, and common very coarse roots; few very fine and fine tubular pores; common mod-

erately thick clay films in pores and on clod faces; 15 percent gravel, 20 percent cobbles and 10 percent stones; mildly alkaline (pH 7.5); abrupt irregular boundary.

R - 24 inches; hard, highly fractured rhyolite, with clay in cracks.

The surface is covered with 10 percent gravel, 20 percent cobbles, and 15 percent stones.

Type Location: About 4.8 miles east on Sugarloaf Road, from its intersection with Highway 395 at Montgomery Pass, and about 0.3 miles southeast of Sugarloaf Road; about 800 feet east and 1,425 feet south of the northeast corner of Section 21, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The control section is the argillic horizon. It is clay or clay loam with 35 to 45 percent clay. Rock fragments are 40 to 50 percent.

Some pedons have a C horizon.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is loamy sand, coarse sandy loam or loam with 4 to 20 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 20 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral (pH 7.0).

The Bt horizon has dry color of 10YR 5/4 or 6/3, or 5Y 6/6; moist color is 10YR 4/3 or 4/4 or 5Y 4/6. It is loam, clay loam or clay, with 18 to 45 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 20 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.5).

Beveridge Family

The Beveridge family consists of shallow, well drained soils forming in colluvium from limestone and dolomite. These soils are on mountainsides. Slope is 60 to 80 percent. Elevation is 6,400 to 9,300 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a south by southwest-facing mountainside, under Curleaf Mountain Mahogany, Singleleaf Pinyon Pine, and Big Sagebrush, at an elevation of 9,200 feet. Slope is 60 percent. When described (9/25/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 2 inches; pale brown (10YR 6/3) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine intersitital pores; violently effervescent, disseminated lime; 35 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C1 - 2 to 9 inches; brown (10YR 5/3) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine, and common medium and coarse roots; many very fine interstitial pores; violently effervescent, disseminated lime; 25 percent gravel, 40 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); gradual wavy boundary.

C2 - 9 to 13 inches; brown (10YR 5/3) extremely stony loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine, many medium, and common coarse roots; many very fine interstitial pores; violently effervescent, disseminated lime; 30 percent gravel, 5 percent cob-

bles and 50 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 13 inches; hard, fractured limestone.

Type Location: About 7.1 miles west on Indian Creek Road, from its intersection with Nevada Highway 3A, then 1.9 miles southwest on the south fork of the road and 0.3 miles upslope, on the east side of the road; about 0.4 mile east and 0.35 mile south of the northwest corner of Section 28, T.2S., R.34E., MDBM, Mt. Barcroft NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 10 to 20 inches. The mean annual soil temperature at the lithic contract is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 inches to the lithic contact. It is usually dry in all parts from early April to mid October when the soil temperature is above 9°F. The textural control section is the whole soil in soils 14 inches or less deep, and is at 10 inches to the lithic contact in soils deeper than 14 inches. It is medium sand, loamy sand, sandy loam or loam, with 2 to 13 percent clay, and an average of about 9 percent. Rock fragments range from 35 to 85 percent by volume, and average about 48 percent. It has about 50 percent calcium carbonates by weight, and no evidence of gypsum. Effervescence is violent throughout.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3, 4/2 or 4/3. It is medium sand, loamy sand or loam, with 2 to 10 percent clay. Rock fragments are 15 to 65 percent gravel and 0 to 5 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0 to 8.2).

The B horizon has dry color of 10YR 5/3, 6/3 or 7/3; moist color is 10YR 3/4, 4/3 or 5/4. It is sandy loam or loam, with 7 to 13 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 40 percent cobbles and 0 to 50 percent stones by volume. Reaction is moderately alkaline (pH 7.8 to 8.0).

Blackston Family

The Blackston family consists of deep, well drained soils forming in older alluvium from mixed rock. These soils are on dissected alluvial fans. Slope is 15 to 30 percent. Elevation is 5,200 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Typic Calciorthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing dissected alluvial fan, under Spiney Menodora and Nevada Ephedra, at an elevation of 6,000 feet. Slope is 19 percent. When described (10/30/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate very thin and thin platy structure; soft, friable, nonsticky and nonplastic; many very fine vesicular pores; strongly effervescent, disseminated lime; 25 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

A12 - 3 to 7 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 4/3) moist; weak very fine and fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine and few fine and medium roots; many very fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

C1ca - 7 to 17 inches; light gray (10YR 7/2) gravelly loam, yellowish brown (10YR 5/4) moist; weak very fine, fine and medium subangular blocky and granular structure; soft, friable, slightly sticky and slightly plastic; common very fine, and few fine and medium roots; many very fine interstitial pores; violently effervescent lime coatings on the undersides of 50 percent of the rock fragments; strongly effervescent, disseminated lime; 20 percent gravel and 3 percent cobbles; mildly alkaline (pH 7.7); clear irregular boundary.

C2ca - 17 to 39 inches; white (10YR 8/2) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive, soft, friable, slightly sticky and slightly plastic; few fine and medium roots; many very fine

interstitial pores; calcium carbonate equivalent is 58 percent; 24 percent degrading violently effervescent calcium carbonate fragments by volume; 13 percent violently effervescent calcium carbonate coatings and pendants by volume, on undersides of rock fragments; violently effervescent, disseminated lime; 70 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); gradual wavy boundary.

C3ca - 39 to 60 inches; white (10YR 8/2) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine interstitial pores; 7 percent lenses of discontinuous indurated material by volume; 16 percent violently effervescent calcium carbonate coatings and pendants by volume, on undersides of rock fragments; 3 percent violently effervescent calcium carbonate concretions; violently effervescent, disseminated lime; 80 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.8).

The soil surface is covered with 52 percent gravel.

Type Location: About 3.95 miles east on Westgard Road, from its intersection with Highway 395, then 0.95 mile north on jeep trail, and 685 feet west of the trail; about 0.2 mile west and 0.4 mile south of the northeast corner of Section 23, T.8S., R.34E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 35 inches. It is usually dry in all parts from early February to late November. The 10 to 40 inch textural control section is sandy loam or loam, with 17 to 19 percent clay, and an average of less than 18 percent. Rock fragments average 67 percent by volume. The soil is mildly alkaline (pH 7.6 to 7.8) and strongly to violently effervescent throughout.

The A horizon has dry color of 10YR 7/3; moist color is 10YR 4/3. It is sandy loam with 17 percent clay. Rock fragments are 25 percent gravel by volume.

The Cca horizon has dry color of 10YR 7/2 or 8/2; moist color is 10YR 5/4 or 6/3. It is sandy loam or loam with 17 to 19 percent clay. Rock fragments are 70 to 80 percent gravel and 10 to 15 percent cobbles by volume.

Bluewing Family

The Bluewing family consists of very deep, somewhat excessively drained soils forming in alluvium from mixed rock. These soils are on valley floors and in drainage bottoms. Slope is 5 to 30 percent. Elevation is 3,800 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Sandy-skeletal, mixed, mesic Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a west-facing drainage bottom, under Boxthorn and Shadscale, at an elevation of 4,600 feet. Slope is 8 percent. When described (4/27/80), the soil was dry throughout. (Colors are for day soil unless otherwise noted.)

A1 - 0 to 3 inches; pale brown (10YR 6/3) very stony loamy fine sand, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel, 30 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear irregular boundary.

C1 - 3 to 12 inches; pale brown (10YR 6/3) very stony loamy fine sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; many fine and few medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel, 30 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

C2 - 12 to 35 inches; pale brown (10YR 6/3) very cobbly loamy fine sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; common fine and few medium roots; many very fine and fine interstitial pores; violently effervescent,

disseminated lime; 30 percent gravel, 20 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

C3 - 35 to 70 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel, 5 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent cobbles.

Type Location: About 3.5 miles east on Waucoba Road, from its intersection with Westgard Road and about 500 feet south of road; about 700 feet west and 800 feet north of the southwest corner of the northwest quarter of Section 18, T.9S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 19 to 54 inches. It is usually dry in all parts from early February to late November. Rock fragments in the control section range from 55 to 70 percent and average 60 percent. The profile is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 6/3 or 6/2; moist color is 10YR 4/3 or 4/2. It is loamy fine sand or loamy sand with 10 to 40 percent gravel, 5 to 30 percent cobbles, and 0 to 20 percent stones. Effervescence is slight to violent.

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3 or 6/3. It is loamy fine sand and loamy sand, with 10 to 60 percent gravel, 5 to 40 percent cobbles and 5 to 20 percent stones. Effervescent is violent.

Bondranch Family

The Bondranch family consists of shallow, well drained soils forming in colluvium from sandstone, siltstone and shale. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 6,000 to 9,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Mormon Tea, at an elevation of 8,800 feet. Slope is 21 percent. When described (10/23/78), the soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 1 inch; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure, parting to weak very fine subangular blocky and granular; soft, friable, nonsticky and slightly plastic; few very fine roots; many very fine and common fine tubular pores; 45 percent gravel, 5 percent cobbles and 5 percent stones; neutral (pH 6.9); abrupt smooth boundary.

A12 - 1 to 5 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine tubular pores; 15 percent gravel and 2 percent cobbles; neutral (pH 7.2); clear wavy boundary.

B1 - 5 to 10 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure, parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine and fine tubular pores; 30 percent gravel and 3 percent cobbles; neutral (pH 7.1); clear wavy boundary.

B2 - 10 to 16 inches; yellowish brown (10YR 5/4) gravelly loam, brown (10YR 4/3) moist; moderate

medium subangular blocky structure, parting to moderate fine subangular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; 20 percent gravel; neutral (pH 6.9); abrupt wavy boundary.

R - 16 inches; hard metamorphosed cambrian marine bedrock.

The soil surface is covered with 65 percent gravel and 5 percent cobbles.

Type Location: About 6.45 miles north on Bristlecone Road, from its intersection with Westgard Road, then about 50 feet west of the road; about 0.1 mile east and 0.2 mile north of the southwest corner of Section 7, T.7S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 12 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October, and moist the rest of the year in some or all parts. The textural control section is 10 inches to the lithic contact for pedons deeper than 14 inches, or the whole soil in those pedons 14 inches or less deep. It is loamy sand, sandy loam or loam with 3 to 23 percent clay, and an average of 16 percent. Rock fragments range from 10 to 20 percent by volume and average 17 percent. Reaction is neutral (pH 6.9 to 7.2) throughout the soil profile.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/2. It is loamy sand or sandy loam with 3 to 17 percent clay by weight. Rock fragments are 10 to 45 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume.

The B horizon has dry color of 10YR 5/3, 5/4 or 6/6; moist color is 10YR 3/3, 4/3 or 5/4. It is sandy loam or loam with 10 to 23 percent clay by weight. Rock fragments are 15 to 30 percent gravel and 0 to 3 percent cobbles by volume.

The lithic contact is sandstone, siltstone, or shale.

Brad Family

The Brad family consists of shallow, excessively drained soils forming in residuum from quartz monzonite. These soils are on upland sideslopes, ridges and benches. Slope is 15 to 80 percent. Elevation is 5,900 to 9,800 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Sandy-skeletal, mixed, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine and Mountain Mahogany, at an elevation of 9,120 feet. Slope is 31 percent. When described (5/22/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 3 inches; dark grayish brown (10YR 4/2) very gravelly sand, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; 50 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

C1 – 3 to 6 inches; dark grayish brown (10YR 4/2) very gravelly loamy sand, very dark grayish brown (10YR 3/2) moist, massive; soft, very friable, nonsticky and nonplastic; common fine roots; many fine interstitial pores; 45 percent gravel and 5 percent cobbles; neutral (pH 7.3); abrupt smooth boundary.

R – 6 inches; hard quartz monzonite.

The soil surface is covered with 20 percent cobbles and 10 percent stones.

Type Location: About 1,100 feet east and 1,000 feet south of the center of Section 12, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 4 to 8 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 3 to 6 inches. It is usually dry in all parts from mid June to late September, and usually moist in some or all parts the rest of the year. The textural control section is the whole soil. It is sand or loamy sand, with an average of about 5 percent clay. Rock fragments range from 35 to 80 percent by volume and average 50 percent. Reaction is neutral (pH 7.0 to 7.3) throughout the profile.

The A horizon has dry color of 10YR 4/2, 5/2, 5/3 or 5/4; moist color is 10YR 3/2, 3/3 or 4/2. It is sand or loamy sand with 40 to 50 percent gravel, 5 to 20 percent cobbles and 0 to 20 percent stones.

The C horizon has dry color of 10YR 4/2, 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand with 35 to 45 percent gravel, 0 to 5 percent cobbles and 0 to 30 percent stones.

Bregar Family

The Bregar family consists of shallow, well drained soils forming in colluvium from siltstone, shale and sandstone. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,100 to 9,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Lithic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 8,960 feet. Slope is 45 percent. When described (9/23/80), the soil was dry in the upper two inches and slightly moist and moist below that depth. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 2 inches; light brownish gray (2.5Y 6/2) very cobbly loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure; soft, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial, and common very fine and fine vesicular pores; 40 percent gravel, 15 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.5); clear wavy boundary.

B21t - 2 to 11 inches; light yellowish brown (2.5Y 6/4) extremely cobbly loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium, and common coarse roots; common very fine and fine interstitial, and few very fine and fine tubular pores; few thin clay films bridging mineral sandgrains and in pores; common violently effervescent lime coatings on the undersides of rock fragments, and slightly effervescent disseminated lime; 50 percent gravel, 20 percent cobbles and 5 percent stones; neutral (pH 7.0); clear irregular boundary.

B22t - 11 to 15 inches; light yellowish brown (2.5Y 6/4) extremely gravelly loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial, and few very fine and fine tubular pores; few thin clay films bridging

mineral sandgrains and in pores; common violently effervescent lime coatings on the undersides of rock fragments, and slightly effervescent disseminated lime; 70 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.5); abrupt irregular boundary.

R - 15 inches; hard, fractured silty shale.

The surface is covered with 40 percent gravel, 15 percent cobbles and 5 percent stones.

Type Location: About 2.2 miles west on Silver Canyon Road, from its intersection with the Bristlecone Road, on the south shoulder of the road; about 530 feet west and 265 feet north of the southeast corner of Section 23, T.6S., R.34E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 15 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is from the 5 inch depth to the lithic contact. It is usually dry in all parts from early April to mid October. The control section is the argillic horizon. It is loam or clay loam with 25 to 30 percent clay. Rock fragments are 75 to 80 percent by volume.

Some pedons are nocalcareous throughout.

The A horizon has dry color of 10YR 6/3 or 6/4, or 2.5Y 6/2; moist color is 10YR 4/3, or 2.5Y 4/2 or 4/4. It is sandy loam, loam or clay loam with 10 to 60 percent gravel, 5 to 15 percent cobbles and 0 to 5 percent stones by volume. Clay content ranges from 16 to 24 percent. Reaction is neutral to mildly alkaline (pH 6.8 to 7.5).

The B horizon has dry color of 10YR 5/4 or 2.5Y 6/4; moist color is 10YR 4/4 or 2.5Y 4/4. It is loam, sandy clay loam or clay loam, with 10 to 70 percent gravel, 5 to 60 percent cobbles and 0 to 5 percent stones by volume. Clay content ranges from 25 to 30 percent. Effervescence is none to slight, and lime coatings on undersides of rock fragments may or may not be present. Reaction is neutral to mildly alkaline (pH 6.7 to 7.8).

Cath Family

The Cath family consists of deep, well drained soils forming in calcareous alluvium from mixed rocks. These soils are on ridges of dissected alluvial fans. Slope is 4 to 30 percent. Elevation is 6,400 to 8,300 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Durixerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a north-facing ridge of an alluvial fan, under Big Sagebrush and Goldenbrush, at an elevation of 7,120 feet. Slope is 6 percent. When described (5/7/80), the soil was moist in the 3 to 18 inch part and dry in all other parts. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 3 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, friable, nonsticky and nonplastic; common fine and medium roots; common very fine vesicular pores; 20 percent gravel and 1 percent cobbles; mildly alkaline (pH 7.5); clear smooth boundary.

B2t – 3 to 12 inches; yellowish brown (10YR 5/4) gravelly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and medium roots; common fine tubular pores; common moderately thick clay films on ped faces and lining pores; 15 percent gravel and 2 percent cobbles; mildly alkaline (pH 7.5); gradual smooth boundary.

B3t – 12 to 18 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few fine interstitial and tubular pores; few moderately thick clay films on ped faces; 30 percent

gravel, 5 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

C1sica – 18 to 60 inches; discontinuous indurated pan, which is brittle and has a very firm consistence when moist.

The soil surface is covered with 10 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 2.7 miles south on a jeep trail, on the south side of the road, then 0.25 mile south on the south fork of the trail, and 165 feet west of the trail; about 370 feet south of the apparent center of Section 3, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the fractured pan is 12 to 18 inches. The mean annual soil temperature at the pan is 47 to 59°F. The soil moisture control section is 5 to 17 inches. It is usually dry in all parts from early April to mid November. The textural control section is the argillic horizon. It is loam or clay loam with 27 to 30 percent clay. Rock fragments are 15 to 17 percent by volume.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 4/2. It is sandy loam or fine sandy loam with 10 to 12 percent clay. Rock fragments are 20 to 25 percent gravel and 1 to 2 percent cobbles by volume. Reaction is mildly alkaline (pH 7.5).

The Bt horizon has dry color of 10YR 5/4; moist color is 10YR 4/3 or 4/4. It is loam or clay loam with 26 to 30 percent clay. Rock fragments are 10 to 30 percent gravel, 2 to 5 percent cobbles and 0 to 1 percent stones by volume. Reaction is mildly to moderately alkaline (pH 7.5 to 8.0).

The Csica horizon is a highly fractured duripan, with roots present in cracks.

Checkett Family

The Checkett family consists of shallow, well drained soils forming in colluvium from metasediments dominated by quartzitic sandstone. The soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,800 to 8,400 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,360 feet. Slope is 40 percent. When described (5/16/81), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 – 0 to 2 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine vesicular and interstitial pores; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A12 – 2 to 6 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; few fine interstitial pores; 20 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

B21t – 6 to 15 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, friable, sticky and plastic; common fine and medium roots; common medium tubular pores; common moderately thick clay films on ped faces; 30 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

B22t – 15 to 19 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky struc-

ture; slightly hard, firm, sticky and plastic; common fine roots; common medium tubular pores; common moderately thick clay films on ped faces; 25 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

R – 19 inches; hard metasediments.

The surface is covered with 20 percent cobbles and 10 percent stones.

Type Location: About 10.8 miles east of Highway 395 on Westgard Road, then about 1.7 miles south on jeep trail, then about 500 feet east on the east fork of the trail and about 250 feet south of the trail; 300 feet east and 250 feet south of the apparent center of Section 21, T.8S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 9 to 19 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 17 inches. It is usually dry in all parts from early April to mid October. The textural control section is the argillic horizon for pedons deeper than 14 inches, or the whole soil for pedons 14 inches or less deep. It is sandy loam, sandy clay loam or clay, with 7 to 43 percent clay and an average of 28 percent. Rock fragments range from 30 to 55 percent by volume, and average 41 percent.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam, fine sandy loam or sandy clay loam, with 15 to 40 percent gravel and 0 to 5 percent cobbles. Clay content is 7 to 25 percent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The Bt horizon has dry color of 10YR 5/4 or 7.5YR 6/4; moist color is 10YR 3/3 or 4/3, or 7.5YR 4/4. It is sandy clay loam, clay loam or clay, with 25 to 50 percent gravel and 0 to 20 percent cobbles. Clay content is 20 to 43 percent and averages less than 35 percent. Reaction is mildly to moderately alkaline (pH 7.5 to 8.0).

Credo Family

The Credo family consists of moderately deep to deep, well drained soils forming in residuum from pyroclastic rocks. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,300 to 8,600 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine-loamy, mixed, frigid Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine, Juniper and Rabbitbrush, at an elevation of 8,000 feet. Slope is 35 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 2 inches; light brownish gray (10YR 6/2) very gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 40 percent gravel; slightly acid (pH 6.4); clear smooth boundary.

B1 - 2 to 9 inches; light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 3/3) moist; moderate coarse and medium subangular blocky structure, parting to moderate very fine and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; 5 percent gravel and 5 percent cobbles; slightly acid (pH 6.3); clear wavy boundary.

B21t - 9 to 16 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure, parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine and common fine tubular pores; few thin clay films bridging mineral sand grains; 20 percent gravel and 5 percent cobbles; medium acid (pH 5.8); abrupt smooth boundary.

B22t - 16 to 28 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure, parting

to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine, and common medium tubular pores; common thin and moderately thick clay films on ped faces and in pores; 20 percent gravel and 5 percent cobbles; medium acid (pH 5.8); clear wavy boundary.

C1 - 28 to 37 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium interstitial pores; 5 percent gravel and 5 percent cobbles; medium acid (pH 5.9).

Cr - 37 inches; highly weathered pyroclastic material.

Type Location: About 0.2 mile east and 0.3 mile north of the southwest corner of Section 24, T.3N., R.29E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Soil depth is 37 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 5 to 21 inches. It is usually dry in all parts from early April to mid November. The textural control section is the argillic horizon. It is loam, sandy clay loam or clay loam, with 21 to 28 percent clay. Rock fragments are 0 to 25 percent by volume.

The A horizon has dry color of 10YR 6/2; moist color is 10YR 3/2, 4/2, or 4/3. It is coarse sand, loamy sand or sandy clay loam, with 2 to 21 percent clay. Rock fragments are 0 to 40 percent gravel by volume. Reaction is slightly acid to neutral (pH 6.3 to 6.6).

The B horizon has dry color of 10YR 5/3, 6/2 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam, loam, sandy clay loam or clay loam, with 19 to 28 percent clay. Rock fragments are 0 to 20 percent gravel and 0 to 5 percent cobbles by volume. Reaction is medium acid to neutral (pH 5.8 to 6.7).

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is sandy loam, loam or clay loam, with 13 to 28 percent clay. Rock fragments are 0 to 5 percent gravel and 0 to 5 percent cobbles by volume. Reaction is medium acid to neutral (pH 5.9 to 6.6).

Dunul Family

The Dunul family consists of deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 50 to 70 percent. Elevation is 5,900 to 9,500 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,960 feet. Slope is 65 percent. When described (9/3/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

01 – 1 to 0 inches; pine needles; abrupt wavy boundary.

A1 – 0 to 3 inches; pale brown (10YR 6/3) very gravelly loamy sand, grayish brown (10YR 5/2) moist; weak very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine pores; 35 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

C1 – 3 to 8 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, and common fine, medium and coarse roots; many very fine and fine interstitial pores; 45 percent gravel and 15 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C2 – 8 to 15 inches; pale brown (10YR 6/3) very gravelly medium sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and medium roots; many very fine and fine interstitial pores; 50 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

C3 – 15 to 26 inches; very pale brown (10YR 7/4) very gravelly medium sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very coarse roots;

many very fine and fine interstitial pores; 40 percent gravel; mildly alkaline (pH 7.5); gradual smooth boundary.

C4 – 26 to 60 inches; very pale brown (10YR 7/4) gravelly medium sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium and common coarse roots; many very fine and fine interstitial pores; 30 percent gravel and 3 percent cobbles; moderately alkaline (pH 8.0).

The soil surface is covered with 5 percent gravel, 10 percent cobbles and 30 percent stones.

Type Location: About 6.75 miles west on Leidy Creek Road, from its intersection with Nevada Highway 3A, and 0.2 mile upslope, on the north side of the road; about 2,000 feet west of the southeast corner of Section 3, T.3S., R.34E., MDBM, Mt. Barcroft NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 17 to 50 inches. It is usually dry in all parts from early February to late November. The textural control section is 10 to 40 inches. It is medium sand or loamy sand with about 2 percent clay. Rock fragments are 33 to 50 percent by volume, and average about 42 percent.

The O horizon is 1/2 to 1 inch thick.

The A horizon has dry color of 10YR 6/3; moist color is 10YR 4/3 or 5/2. It is loamy sand with 2 percent clay. Rock fragments are 35 to 40 percent gravel by volume. Reaction is slightly acid (pH 6.5).

The C horizon has dry color of 10YR 6/3, 6/4 or 7/4; moist color is 10YR 4/3 or 4/4. It is medium sand or loamy sand with 2 percent clay. Rock fragments are 30 to 50 percent gravel and 0 to 15 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Durargidic Argixerolls

These Durargidic Argixerolls consist of deep, well drained soils forming in alluvium from mixed granitic rocks. These soils are on alluvial fans. Slope is 2 to 15 percent. Elevation is 8,400 to 10,100 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is 44°F.

Taxonomic Class: Coarse-loamy, mixed, frigid Durargidic Argixerolls.

Reference Pedon: The representative profile for this soil is on a south-facing alluvial fan, under Black Sagebrush and Cottonthorn, at an elevation of 8,450 feet. Slope is 2 percent. When described (5/20/80), the soil was slightly moist in the 12 to 25 inch section and dry throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 4 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many fine interstitial pores; 5 percent gravel; neutral (pH 7.0); clear smooth boundary.

B1 – 4 to 12 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots; many very fine interstitial and few fine tubular pores; 10 percent gravel-size durinodes by volume; 10 percent gravel; neutral (pH 7.0); clear smooth boundary.

B2t – 12 to 25 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; 25 percent gravel-size durinodes; common thin clay films on ped faces and in pores; 5 percent gravel; neutral (pH 7.2); gradual smooth boundary.

C1 – 25 to 35 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial, and common fine

tubular pores; 15 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

C2 – 35 to 45 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; 30 percent gravel; mildly alkaline (pH 7.4); gradual wavy boundary.

Cr – 45 inches; highly weathered adamellite.

Type Location: In Papoose Flat; about 105 feet west and 0.35 mile north of the southeast corner of Section 2, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is 45 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 30 inches. It is usually dry in all parts from mid April to late September and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is sandy loam, with 12 to 15 percent clay. Rock fragments are 5 to 10 percent gravel by volume. Gravel-size durinodes are 20 to 25 percent by volume. The soil matrix is nonbrittle. The transitional B horizon has 10 percent gravel-size durinodes by volume, in a non-brittle matrix.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/3. It is loamy sand or sandy loam, with 5 to 7 percent clay. Rock fragments are 5 percent gravel by volume. Reaction is neutral (pH 7.0 to 7.2).

The B horizon has dry color of 10YR 5/3, 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam with 10 to 15 percent clay. Rock fragments are 5 to 15 percent gravel by volume. Gravel-size durinodes are 10 to 25 percent by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.6).

The C horizon has dry color of 10YR 5/4, 6/3 or 6/6; moist color is 10YR 4/3, 4/4 or 5/6. It is coarse sandy loam or sandy loam, with 8 to 12 percent clay. Rock fragments are 15 to 30 percent gravel by volume. Reaction is mildly alkaline (pH 7.4 to 7.8).

Finley Family

The Finley family consists of moderately deep, well drained soils forming in colluvium from sedimentary rocks, composed mainly of quartzitic sandstone. These soils are on mountainsides. Slope is 15 to 40 percent. Elevation is 5,600 to 7,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on an east-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,400 feet. Slope is 40 percent. When described (4/25/80), the soil was slightly moist below 7 inches. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 7 inches; light brownish gray (10YR 6/2) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; few very fine interstitial and tubular pores; 20 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

B2 - 7 to 18 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few medium, common fine and very fine roots; few fine interstitial pores; 45 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.5); clear smooth boundary.

C1 - 18 to 29 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and nonplastic; few fine roots; few fine interstitial pores; slightly effervescent, disseminated line; 40 percent gravel; moderately alkaline (pH 8.0); abrupt smooth boundary.

R - 29 inches; Hard sedimentary rock.

The surface is covered by 40 percent cobbles and 5 percent stones.

Type Location: About 15.1 miles east on Westgard Road, from its intersection with Highway 395, then about 0.95 mile east on jeep trail on east side of road, and about 100 feet west of jeep trail; 200 feet west of the southeast corner of the northeast quarter of Section 29, T.7S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 25 to 35 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 36 inches. It is usually dry in all parts from early April to mid October. The textural control section is 10 to 35 inches. It is sandy loam, fine sandy loam, loam, sandy clay loam or clay loam, with 11 to 29 percent clay, and an average of about 16 percent. Rock fragments range from 40 to 80 percent by volume and average about 52 percent.

The A horizon has dry color of 10YR 5/2 or 6/2; moist color is 10YR 3/3 or 3/2. It is loamy sand, fine sandy loam or loam, with 4 to 15 percent clay. Rock fragments are 20 to 45 percent gravel, 0 to 20 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The B horizon has dry color of 10YR 5/3, 4/2 or 6/3; moist color is 10YR 4/3. It is loam, sandy clay loam or clay loam, with 16 to 22 percent clay. Rock fragments are 30 to 45 percent gravel, 5 to 15 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The C horizon has dry color of 10YR 5/4 or 6/3, or 7.5YR 5/4; moist color is 10YR 4/3 or 4/4, or 7.5YR 4/4. It is sandy loam, loam or sandy clay loam, with 11 to 26 percent clay. Rock fragments are 35 to 80 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones by volume. Effervescence is none to slight. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Gol Family

The Gol family consists of shallow, well drained soils forming in alluvium from quartz monzonite. These soils are on sideslopes of alluvial fans. Slope is 4 to 15 percent. Elevation is 8,400 to 9,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid, shallow Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a north-facing alluvial fan ridge, under Big Sagebrush and Mormon Tea, at an elevation of 8,500 feet. Slope is 4 percent. When described (5/21/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; common fine and medium interstitial pores; 20 percent gravel; neutral (pH 7.2); clear smooth boundary.

B21t - 4 to 9 inches; yellowish brown (10YR 5/4) gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular and interstitial pores; common thin clay films coating mineral sandgrains; 25 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.4); clear smooth boundary.

B22t - 9 to 14 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and non-

plastic; few fine roots; many fine interstitial pores; few moderately thick clay films coating mineral sandgrains; 45 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.4); clear wavy boundary.

Cr - 14 inches; weathered adamellite.

The surface is covered with 2 percent cobbles.

Type Location: In Papoose Flat, about 530 feet west and 1,060 feet south of the apparent center of Section 2, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range Characteristics: Depth to the paralithic contact ranges from 9 to 14 inches. The mean annual soil temperature at the paralithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 14 inches. It is usually dry in all parts from early April to mid October. The control section includes all of the soil profile. It is loamy sand and sandy loam, with an average of 14 percent clay. Rock fragments are 10 to 45 percent gravel and 0 to 5 percent cobbles by volume, and average about 28 percent.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or sandy loam, with 5 to 10 percent clay and 10 to 20 percent gravel. Reaction is neutral (pH 7.2).

The Bt horizon has dry color of 10YR 4/4 or 5/4; moist color is 10YR 4/3. It is sandy loam with 17 percent clay, and 25 to 45 percent gravel and 5 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.2 to 7.4).

Hartig Family

The Hartig family consists of moderately deep and deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,800 to 10,300 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid, Aridic Hapoxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Big Sagebrush and Common Pricklygilia at an elevation of 10,240 feet. Slope is 50 percent. When described (7/27/80), the soil was dry in the upper 5 inches and slightly moist in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 5 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, few fine and medium roots; many very fine and common fine interstitial pores; 15 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

A12 – 5 to 11 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, few fine, medium and coarse roots; many very fine interstitial pores; 20 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C1 – 11 to 33 inches; brown (10YR 5/3) extremely stony fine sandy loam, dark brown (10YR 4/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, common fine and medium, and few coarse roots; many very fine and few fine interstitial pores; violently effervescent lime coatings on the undersides of 20 percent of the rock fragments; 35 percent gravel, 10 percent cobbles and 20 percent stones; mildly alkaline (pH 7.8); abrupt irregular boundary.

R – 33 inches; hard fractured bedrock.

The soil surface is covered with 2 percent stones, 10 percent cobbles and 25 percent gravel.

Type Location: About 1.55 miles east of Camp Bristlecone, on North Fork Crooked Creek Road, and about 200 yards upslope, on the north side of the road; about 850 feet west and 580 feet north of the southeast corner of Section 17, T.5S., R.35E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 24 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts from April to late September and is usually moist in some or all parts the rest of the year. Reaction ranges from neutral to mildly alkaline and increases with increasing depth. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam, fine sandy loam, loam or sandy clay loam, with 5 to 25 percent clay and an average of 11 percent. Rock fragments are 30 to 90 percent by volume, and average 61 percent.

Some pedons have B2 horizons and lack C horizons. Other pedons have thin O horizons.

The A horizon has dry color of 10YR 4/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand, sandy loam or loam, with 5 to 17 percent clay. Rock fragments are 5 to 35 percent gravel, 0 to 20 percent cobbles and 0 to 30 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

The C horizon has dry color of 10YR 5/3, 6/3 or 6/4; moist color is 10YR 3/4, 4/3 or 5/4. It is sand, loamy sand, sandy loam or fine sandy loam, with 3 to 11 percent clay. Rock fragments are 15 to 65 percent gravel, 0 to 30 percent cobbles and 0 to 45 percent stones by volume. Effervescence is none to violent. Reaction is neutral to moderately alkaline (pH 7.2 to 8.0).

Hymas Family

The Hymas family consists of shallow, well drained soils forming in colluvium from calcareous sedimentary rock, made up mostly of limestone and dolomite. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 5,600 to 10,000 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Juniper, at an elevation of 8,880 feet. Slope is 40 percent. When described (5/21/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 1 inch; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common medium vesicular pores, slightly effervescent disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A12 - 1 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; few fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

C1ca - 6 to 19 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and medium roots; few fine interstitial pores;

violently effervescent, disseminated lime; 40 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 19 inches; hard, fractured dolomite.

The surface is covered by 20 percent cobbles and 10 percent stones.

Type Location: About 1,000 feet south of Blue Bell Mine, on loop trail, and 600 feet east of trail (east of Badger Flat); about 1,200 feet east and 600 feet north of the apparent center of Section 24, T.11S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 4 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 10 to 19 inches. It is usually dry in all parts from mid June to mid August, and usually moist in some or all parts the rest of the year. The textural control section is 10 to 20 inches in pedons deeper than 14 inches, or the entire profile in pedons 14 inches or less deep. It is sandy loam or loam with 14 to 22 percent clay and an average of 17 percent. Rock fragments average 40 percent by volume. The soil is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 3/3. It is sandy loam or loam with 13 to 17 percent clay. Rock fragments are 20 to 35 percent by volume. Effervescence is slight to strong.

The Cca horizon has dry color of 10YR 5/4; moist color is 10YR 3/3 or 4/3. It is sandy loam or loam with 16 to 22 percent clay. Rock fragments are 40 percent by volume. Effervescence is violent.

Lithic Camborthids

These Lithic Camborthids consist of shallow, well drained soils forming in colluvium weathered from metasedimentary rocks. These soils are on mountainsides. Slope is 2 to 60 percent. Elevation is 4,100 to 6,900 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic, Lithic Camborthids.

Reference Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Shadscale and Boxthorn, at an elevation of 6,100 feet. Slope is 40 percent. When described (4/29/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; many fine and very fine interstitial pores; strongly effervescent, disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B2 - 3 to 8 inches; pale brown (10YR 6/2) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, sticky and plastic; many fine roots; many fine and very fine interstitial pores; slightly effervescent, disseminated lime; 20 percent gravel and 30 percent cobbles; moderately alkaline (pH 8.0); clear irregular boundary.

R - 8 inches; hard fractured metasediments.

The soil surface is covered with 10 percent cobbles.

Type Location: About 11.9 miles east on Citrus Road, from its intersection with Highway 395, just south of Independence, and 265 feet west of the road; about 2,375 feet east and 1,160 feet south of the northwest corner of Section 19, T.12S., R.36E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 8 to 20 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 8 inches. It is usually dry in all parts from early February to late November. The textural control section includes all of the soil from the surface to the lithic contact. It is loam or sandy loam with an average of about 21 percent clay. Rock fragments average 44 percent.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2. It is loam or sandy loam with 16 to 22 percent clay. Rock fragments are 20 to 40 percent gravel and 0 to 5 percent cobbles. Effervescence is slight to strong. Reaction is moderately alkaline (pH 8.0).

The B horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is loam or sandy loam with 18 to 25 percent clay. Rock fragments are 30 to 50 percent gravel and 0 to 20 percent cobbles. Effervescence is slight to strong. Reaction is moderately alkaline (pH 8.0).

Mackey Family

The Mackey family consists of deep, well drained soils forming in alluvium from metasedimentary rocks. These soils are on alluvial fans. Slope is 2 to 30 percent. Elevation is 5,100 to 8,400 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 45°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southeast-facing alluvial fan, under Big Sagebrush and Goldenbush, at an elevation of 7,120 feet. When described (5/2/80), the soil was moist in the upper 42 inches and dry in the rest of the profile. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 3 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; 30 percent gravel and 2 percent cobbles; mildly alkaline (pH 7.8); clear smooth boundary.

B2 - 3 to 24 inches; brown (10YR 5/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, nonsticky and slightly plastic; common fine and medium roots; common fine interstitial pores; 35 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear smooth boundary.

B3ca - 24 to 42 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 40 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1ca - 42 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and nonplastic; many fine interstitial pores; strongly effervescent, disseminated lime; 45 percent gravel, 20 percent cobbles and 1 percent stones; moderately alkaline (pH 8.2).

The surface is covered by 10 percent gravel.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 3.0 miles south on a jeep trail on the south side of the road, staying on the westerly forks of the trail, then about 0.2 mile upslope on a mine jeep trail on the north side of the first mentioned jeep trail and about 750 feet west of the mine jeep trail; about 530 feet east and 1,320 feet south of the northwest corner of Section 3, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 35 inches. It is usually dry in all parts from early April to mid November. The textural control section is 10 to 40 inches. It is coarse sand, loamy sand, coarse sandy loam, sandy loam or loam with 2 to 18 percent clay, and an average of about 9 percent. Rock fragments range from 15 to 90 percent, and average 59 percent. Depth to the calcareous layer is 24 to 42 inches.

Some pedons have thin O horizons.

The A horizon has dry color of 10YR 5/2, 5/3, 6/2 or 6/3; moist color is 10YR 3/2, 3/3 or 4/2. It is loamy sand, loamy fine sand or sandy loam with 3 to 12 percent clay. Rock fragments are 3 to 40 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The B2 horizon has dry color of 10YR 5/3, 6/3, 6/4 or 7/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or loam with 7 to 18 percent clay. Rock fragments are 12 to 60 percent gravel, 0 to 10 percent cobbles and 0 to 15 percent stones by volume. It is noneffervescent to violently effervescent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The B3 horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 4/3 or 4/4. It is sandy loam with 12 percent clay. Rock fragments are 40 percent gravel, 8 to 10 percent cobbles and 0 to 2 percent stones. It is noneffervescent to slightly effervescent. Reaction is moderately alkaline (pH 8.0).

The C horizon has dry color of 10YR 6/2, 6/3, 6/4, 7/3, 7/4, 7/6 or 8/6, or 7.5YR 6/6; moist color is 10YR 4/2, 4/3, 5/4 or 5/6, or 7.5YR 5/6. It is coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to

18 percent clay. Rock fragments are 12 to 60 percent gravel, 5 to 40 percent cobbles and 0 to 20 percent stones. It is strongly to violently effervescent. Reaction is moderately alkaline (pH 8.0 to 8.2).

Mascamp Family

The Mascamp family consists of shallow, well drained soils forming in residuum and colluvium from metasedimentary rocks. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,200 to 10,100 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Lithic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Big Sagebrush and Rabbitbrush, at an elevation of 8,720 feet. Slope is 37 percent. When described (5/23/80), this soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 7 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 25 percent gravel; neutral (pH 7.0); clear smooth boundary.

B2t - 7 to 14 inches; yellowish brown (10YR 5/4) very gravelly clay loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, sticky and plastic; common fine and medium roots; common fine interstitial pores; few thin clay films on ped faces; 40 percent gravel and 10 percent cobbles; neutral (pH 7.0); abrupt wavy boundary.

R - 14 inches; hard fractured metasedimentary rock, with fractures 14 inches or more apart.

The surface is covered by 10 percent cobbles.

Type Location: About 0.3 mile west and 0.2 mile south of the northeast corner of Section 23, T.10S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 13 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F, and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 6 to 19 inches. It is usually dry in all parts from mid April to late September and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in those pedons deeper than 14 inches, and is the whole soil in those pedons 14 inches or less deep. Texture of the control section is sandy loam and clay loam, with 18 to 30 percent clay. Rock fragments average 38 percent.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/3. It is sandy loam or loam with 18 to 22 percent clay. Rock fragments are 25 percent gravel and 0 to 5 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The B2t horizon has dry color of 10YR 5/4; moist color is 10YR 4/3. It is clay loam with an average of 30 percent clay. Rock fragments are 40 percent gravel and 10 to 15 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Merlin Family

The Merlin family consists of shallow, well drained soils forming in residuum from basalt. These soils are on plateau tops, upper mountainsides and on ridges. Slope is 5 to 60 percent. Elevation is 6,700 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Clayey, montmorillonitic, frigid
Lithic Argixerolls

Typical Pedon: The representative profile for this soil is on a northerly-facing plateau top, under Low Sagebrush and Squirreltail Grass, at an elevation of 8,320 feet. Slope is 3 percent. When described (9/9/80), the soil was slightly moist below 4 inches. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; many very fine and few fine interstitial pores; 45 percent gravel and 15 percent cobbles; medium acid (pH 6.0); clear wavy boundary.

A12 - 2 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine, medium and coarse roots; many very fine interstitial pores; 15 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

B2t - 4 to 15 inches; brown (7.5YR 5/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; few fine and medium roots; common very fine and few fine tubular pores; many pressure faces on ped faces; 15 percent gravel; neutral (pH 7.0); abrupt irregular boundary.

R - 15 inches; basalt bedrock, which is slightly weathered in the upper inch.

The surface is covered with 60 percent gravel.

Type Location: About 3.5 miles east on Camp Bristlecone Road, from its intersection with the Bristlecone Road and 50 feet east of the Camp Bristlecone Road; about 0.3 mile east, and 0.1 mile south of the north-west corner of Section 4, T.6S., R.36E., MDBM, Blanco Mountain NE Quadrangle.

Range of Characteristics: Depth to the lithic contact ranges from 10 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from mid April to late September, and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in those pedons deeper than 14 inches, and is the whole soil in those pedons 14 inches or less deep. Texture is loam, clay loam or clay, with 20 to 50 percent clay, and a weighted average of about 37 percent. Rock fragments average 15 percent by volume.

The A horizon has dry color of 10YR 5/3 or 7.5YR 5/3; moist color is 10YR 3/3 or 7.5YR 3/2. It is sandy loam or loam, with about 15 percent clay. Rock fragments are 15 to 45 percent gravel and 0 to 20 percent cobbles by volume. Reaction ranges from medium acid to slightly acid (pH 6.0 to 6.5).

The Bt horizon has dry color of 7.5YR 5/2 or 6/3; moist color is 7.5YR 3/2 or 4/3. It is clay loam or clay, with about 37 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction ranges from slightly acid to neutral (pH 6.4 to 7.0).

Mexispring Family

The Mexispring family consists of shallow, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 3,800 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy-skeletal, mixed, nonacid, mesic shallow Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Saltbush, Buckwheat and Ephedra, at an elevation of 5,840 feet. Slope is 20 percent. When described (4/24/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 5 inches; pale brown (10YR 6/3) very gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 45 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

AC - 5 to 11 inches; very pale brown (10YR 7/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine interstitial pores; 30 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

Cr - 11 inches; slightly fractured granodiorite, with fractures about 1mm wide and 40cm apart, which allow a few roots to enter.

The soil surface is covered with 10 percent gravel.

Type Location: About 10.8 miles east on Citrus Road, from its intersection with Highway 395, just south of Independence, and 1.0 mile west of the road; about 0.45 mile east, and 0.25 mile south of the northwest corner of Section 25, T.12S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the paralithic contact is 8 to 12 inches. The mean annual soil temperature at the paralithic contact is 47 to 59°F. The soil moisture control section is from 4 inches to the paralithic contact. It is usually dry in all parts from early February to mid October. The textural control section is the whole soil. It is loamy sand, coarse sandy loam or sandy loam, with 6 to 10 percent clay. Rock fragments are 30 to 45 percent gravel by volume, and average about 38 percent. The soil is moderately alkaline throughout (pH 8.0).

The A horizon has dry color of 10YR 6/3 or 7/3; moist color is 10YR 4/3. It is noneffervescent to slightly effervescent.

Midas Family

The Midas family consists of deep, well drained soils forming in alluvium from mixed rocks. These soils are on alluvial fans and terraces. Slope is 4 to 30 percent. Elevation is 5,500 to 8,100 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Duric Camborthids.

Typical Pedon: The representative profile for this soil is on a northwest-facing alluvial fan top, under Greenfire and Fourwing Saltbush, at an elevation of 6,890 feet. Slope is 5 percent. When described (5/4/80), the soil was moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common fine and medium roots; common fine tubular pores; strongly effervescent, disseminated lime; 35 percent gravel, 2 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); clear smooth boundary.

B2 - 4 to 14 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel, 5 percent cobbles and 2 percent stones; moderately alkaline (pH 8.0) abrupt irregular boundary.

C1sica - 14 to 16 inches; light yellowish brown (10YR 6/4), very gravelly loamy sand, yellowish brown (10YR 5/4) moist; massive; hard, firm, nonsticky and nonplastic; few medium roots; strongly effervescent, disseminated lime; 45 percent gravel, 10 percent cobbles and 5 percent stones; brittle when moist; moderately alkaline (pH 8.0); smooth clear boundary.

C2sica - 16 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, yellowish brown

(10YR 5/4) moist; massive; hard, firm, nonsticky and nonplastic; few fine tubular pores; strongly effervescent, disseminated lime; 45 percent gravel, 15 percent cobbles and 5 percent stones; brittle when moist; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then 0.9 mile south on jeep trail on south side of road, then about 0.2 mile on the east side of the jeep trail; about 0.5 mile south of the northeast corner of Section 35, T.9S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the silica-calcium carbonate cemented layer is 12 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts for early February to late November. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam, loam or sandy clay loam, with 6 to 20 percent clay, and an average of about 12 percent. Rock fragments range from 35 to 65 percent by volume, and average about 56 percent. Effervescence is strong to violent and reaction is moderately alkaline (pH 8.0) throughout.

The A horizon has dry color of 10YR 5/2, 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is sandy loam or loam, with 10 to 16 percent clay. Rock fragments are 35 to 45 percent gravel, 0 to 10 percent cobbles and 0 to 10 percent stones by volume.

The B horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4; moist color is 10YR 4/3, 4/4 or 5/4. It is sandy loam, loam or sandy clay loam, with 14 to 20 percent clay. Rock fragments are 30 to 50 percent gravel, 2 to 10 percent cobbles and 0 to 5 percent stones by volume.

The C horizon has dry color of 10YR 6/3, 6/4 or 7/2; moist color is 10YR 5/3, 5/4, or 6/3. It is loamy sand or sandy loam, with 6 to 17 percent clay. Rock fragments are 40 to 50 percent gravel, 5 to 15 percent cobbles and 0 to 15 percent stones by volume.

Moano Family

The Moano family consists of shallow, well drained soils forming in colluvium from sedimentary rocks composed predominately of quartzitic sandstone. These soils are on ridgetops and mountainsides. Slope is 5 to 80 percent. Elevation is 5,400 to 8,200 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy, mixed, nonacid, mesic
Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing ridgetop, under Big Sagebrush and Singleleaf Pinyon Pine, at an elevation of 7,280 feet. Slope is 7 percent. When described (4/23/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 3 inches; light yellowish brown (10YR 6/4) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and non-plastic; common very fine roots; few fine interstitial pores; 5 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

C1 - 3 to 12 inches; brownish yellow (10YR 6/6) very cobbly clay loam, brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; 20 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0); abrupt smooth boundary.

R - 12 inches; hard quartzitic sandstone.

The soil surface is covered with 20 percent cobbles and 20 percent stones.

Type Location: About 15.1 miles east on Westgard Road, from its intersection with Highway 395, then about 0.95 mile east on jeep trail on east side of road, and about 400 feet west of jeep trail; about 500 feet west of the southeast corner of the northeast quarter of Section 29, T.7S., R.35E., MDBM, Blanco SW Mountain Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 12 to 14 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 12 inches. It is usually dry in all parts from early February to late November. The control section includes all of the soil profile. It is fine sandy loam, loam or clay loam with 12 to 28 percent clay. Rock fragments are 31 to 35 percent by volume and average about 33 percent.

The A horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3. It is loam or fine sandy loam with 15 to 26 percent clay. Rock fragments are 5 to 30 percent gravel by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The C horizon has dry color of 10YR 6/4 or 6/6; moist color is 10YR 4/3. It is loam or clay loam with 17 to 28 percent clay. Rock fragments are 20 to 40 percent gravel and 0 to 20 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0).

Mulett Family

The Mulett family consists of shallow, well drained soils forming in colluvium from noncalcareous sedimentary rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,300 to 8,500 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Lithic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,260 feet. Slope is 30 percent. When described (5/16/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 – 0 to 1 inch; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 10 percent gravel; mildly alkaline (pH 7.5) clear smooth boundary.

A12 – 1 to 6 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, sticky and slightly plastic; common very fine roots; common very fine and fine interstitial pores; 35 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

B2 – 6 to 13 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; soft, very friable, sticky and plastic; common very fine and fine roots; few fine interstitial pores; 40 percent gravel; mildly alkaline (pH 7.5); abrupt wavy boundary.

R – 13 inches; hard nonclareous sedimentary rock.

The soil surface is covered with 10 percent cobbles.

Type Location: About 10.8 miles east on Westgard Road, from its intersection with Highway 395, then 0.6 mile south on a jeep trail, and 100 feet north of the jeep trail; about 825 feet east and 0.5 mile north of the southwest corner of Section 16, T.8S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 10 to 20 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 5 to 17 inches. It is usually dry in all parts from early April to mid October. The textural control section is the whole soil in soils 14 inches or less deep, and is at 10 inches to the lithic contact in soils deeper than 14 inches. It is sandy loam, loam or clay loam, with 7 to 28 percent clay, and an average of 19 percent. Rock fragments range from 10 to 70 percent by volume, and average about 47 percent.

Some pedons have C horizons.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3. It is sandy loam or loam with 7 to 23 percent clay. Rock fragments are 10 to 40 percent gravel by volume. Reaction is mildly to strongly alkaline (pH 7.5 to 8.5).

The B2 horizon has dry color of 10YR 5/4, 6/3, 6/4 or 7/3; moist color is 10YR 4/3 or 5/4. It is sandy loam, loam or clay loam with 9 to 30 percent clay. Rock fragments are 25 to 40 percent gravel, and 0 to 5 percent cobbles by volume. Effervescence is none to slight and reaction is mildly to strongly alkaline (pH 7.5 to 8.5).

Packham Family

The Packham family consists of moderately deep to deep, well drained soils forming in colluvium and alluvium from mixed rocks. These soils are on mountain-sides and alluvial fans. Slope is 30 to 80 percent. Elevation is 6,100 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy - skeletal, mixed, frigid Xerollic Camborthids

Typical Pedon: The representative profile for this soil is on a northwest facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Arizona Wheatgrass, at an elevation of 8,360 feet. Slope is 40 percent. When described (10/6/80), the soil was slightly moist from 3 to 15 inches, and dry throughout the rest of the profile. (Colors are for dry soils unless otherwise noted.)

A1 - 0 to 3 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; moderate very thick platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 30 percent gravel, 20 percent cobbles and 10 percent stones; neutral (pH 7.0); clear wavy boundary.

B21 - 3 to 7 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; common very fine, few fine interstitial, and few very fine and fine tubular pores; 40 percent gravel; neutral (pH 7.0); clear wavy boundary.

B22 - 7 to 15 inches; yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine and fine, and common medium and coarse roots; common very fine, few fine interstitial, and few very fine and fine tubular pores; 60 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C1 - 15 to 27 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam; dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine and coarse, and common medium roots; many very fine and fine interstitial pores; 50 percent gravel and 15 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C2 - 27 to 40 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and coarse, and common medium roots; many very fine and fine interstitial pores; 75 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C3ca - 40 to 44 inches; light yellowish brown (10YR 6/4) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; strongly effervescent, disseminated lime; 50 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C4ca - 44 to 50 inches; very pale brown (10YR 7/3) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; many fine irregularly shaped segregated secondary carbonates occurring in seams; 50 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C5ca - 50 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; many fine irregularly shaped segregated secondary carbonates occurring in seams; 25 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0).

The soil surface is covered with 30 percent gravel, 20 percent cobbles and 10 percent stones.

Type Location: About 4.3 miles east on Queen Canyon Road, from its intersection with Highway 6, then about 0.4 mile south on jeep trail, from its intersection with Queen Canyon Road; about 1,270 feet east and 530 feet north of the southwest corner of Section 31, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4

is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4 to 30 inches. It is usually dry in all parts from early April to mid October. The 10 to 40 inch textural control section is sandy loam, fine sandy loam, loam, sandy clay loam or clay loam, with 6 to 33 percent clay, and an average of about 16 percent. Rock fragments range from 20 to 80 percent by volume, and average about 50 percent. Depth to secondary carbonate accumulations ranges from 3 to 40 inches, but typically is at depths greater than 8 inches.

Some pedons are calcareous throughout.

The A horizon has dry color of 10YR 5/3, 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is loam or sandy loam, with 6 to 20 percent clay. Rock fragments are 5 to 30 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Effervescence is none to

violent. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The B horizon has dry color of 10YR 5/4, 6/3, 6/4, 7/3, or 2.5Y 6/2; moist color is 10YR 4/3, 4/4 or 5/4, or 2.5Y 5/2. It is sandy loam, loam, sandy clay loam or clay loam, with 12 to 33 percent clay. Rock fragments are 15 to 60 percent gravel, 0 to 20 percent cobbles and 0 to 5 percent stones by volume. Effervescence is none to violent. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The C horizon has dry color of 10YR 6/4, 7/3 or 7/4, or 2.5Y 6/2; moist color is 10YR 4/3, 4/4 or 5/3, or 2.5Y 3/2. It is loamy sand, sandy loam, fine sandy loam, loam or sandy clay loam, with 4 to 26 percent clay. Rock fragments are 10 to 75 percent gravel, 0 to 25 percent cobbles and 0 to 25 percent stones by volume. Effervescence is none to violent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.4).

Pergelic Cryoborolls

The Pergelic Cryoborolls consist of moderately deep to deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 9,000 to 14,250 feet. The mean annual precipitation is about 18 inches and the mean annual temperature is about 28°F.

Taxonomic Class: Loamy-skeletal, mixed Pergelic Cryoborolls

Reference Pedon: The representative profile for this soil is on a west-facing mountainside, under Golden-brush, Buckwheat and Pringle Bluegrass, at an elevation of 13,050 feet. Slope is 38 percent. When described, (7/16/80), the soil was moist throughout. (Colors are for dry soil unless otherwise noted.)

O1 - 1 to 0 inch; organic mat, made up of grass roots; abrupt smooth boundary.

A1 - 0 to 2 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure, parting to fine and medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and common fine interstitial pores; 10 percent gravel, 15 percent cobbles and 10 percent stones; neutral (pH 7.0); clear smooth boundary.

B21 - 2 to 9 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and common fine and medium roots; common very fine and fine interstitial pores; 30 percent gravel, 10 percent cobbles and 20 percent stones; neutral (pH 7.0); abrupt wavy boundary.

B22 - 9 to 14 inches; yellowish brown (10YR 5/4) very stony loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine interstitial and few very fine tubular pores; 20 percent gravel, 10 percent cobbles and 25 percent stones; slightly acid (pH 6.5); abrupt wavy boundary.

C1 - 14 to 23 inches; pale brown (10YR 6/3) very stony loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard,

friable, sticky and plastic; few very fine and fine roots; few very fine and fine interstitial and tubular pores; 20 percent gravel, 15 percent cobbles and 25 percent stones; slightly acid (pH 6.5); abrupt wavy boundary.

C2 - 23 to 39 inches; pale brown (10YR 6/3) extremely stony loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine roots; common very fine interstitial, and few very fine and fine tubular pores; 10 percent gravel, 20 percent cobbles and 35 percent stones; strongly acid (pH 5.5); abrupt irregular boundary.

R - 39 inches; hard, fractured granodiorite.

The soil surface is covered with 15 percent gravel, 20 percent cobbles and 15 percent stones.

Type Location: About 0.15 mile east and 320 feet north of the southeast corner of Section 8, T.4S., R.34E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to bedrock is 35 to greater than 60 inches. The mean annual soil temperature at 20 inches is less than 32°F. The soil moisture control section is 4 to 19 inches. It is usually dry in all parts from mid-April to late September, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is sandy loam or loam, with an average of less than 18 percent clay. Rock fragments average about 60 percent by volume.

Some pedons lack O horizons. Other pedons lack B horizons

The O horizon is up to 1 inch thick.

The A horizon has dry color of 10YR 4/2, 4/3 or 5/3, or 2.5Y 5/2; moist color is 10YR 2/2, 3/2 or 3/3, or 2.5Y 3/2. It is sandy loam or loam, with 6 to 15 percent clay. Rock fragments are 5 to 30 percent gravel, 0 to 40 percent cobbles and 0 to 10 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3. It is loam, with 19 percent clay. Rock fragments are 20 to 30 percent gravel, 10 percent

cobbles and 20 to 25 percent stones by volume. Reaction is slightly acid to neutral (pH 6.5 to 7.0).

The C horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4; moist color is 10YR 3/3, 3/4, 4/3 or 4/4. It is sandy

loam or loam, with 7 to 17 percent clay. Rock fragments are 5 to 55 percent gravel, 0 to 40 percent cobbles and 0 to 35 percent stones by volume. Reaction is slightly to strongly acid (pH 5.5 to 6.5).

Preston Family

The Preston family consists of deep, somewhat excessively drained soils forming in eolian deposits from mixed rocks. These soils are on stabilized dunes and in depressions. Slope is 1 to 15 percent. Elevation is 6,400 to 7,900 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Mixed, mesic Typic Xeropsamments.

Typical Pedon: The representative profile for this soil is on a stabilized dune, under Big Sagebrush and Indian Ricegrass, at an elevation of 6,900 feet. Slope is 8 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 – 0 to 2 inches; pale brown (10YR 6/3) sand, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.6); clear smooth boundary.

A12 – 2 to 6 inches; pale brown (10YR 6/3) sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.6); clear wavy boundary.

C1 – 6 to 9 inches; pale brown (10YR 6/3) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; common very fine, and few fine and medium roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.7); clear wavy boundary.

C2 – 9 to 14 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial

pores; 10 percent gravel; neutral (pH 6.7); gradual smooth boundary.

C3 – 14 to 21 inches; light gray (10YR 7/1) fine sand, grayish brown (10YR 5/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine, fine and medium roots; many medium interstitial pores; neutral (pH 6.6); clear smooth boundary.

C4 – 21 to 60 inches; pale brown (10YR 6/3) fine sand, brown (10YR 4/3) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine roots; many medium interstitial pores; neutral (pH 6.9).

The surface is covered with 5 percent gravel.

Type Location: About 1,600 feet east and 330 feet north of the southwest corner of Section 34, T.3N., R.29E., MDBM, Trench Canyon SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 13 to 60 inches. It is usually dry in all parts from mid April to late September. The 10 to 40 inch textural control section is coarse sand, sand, fine sand, loamy coarse sand or loamy sand, with 2 to 3 percent clay. Rock fragments are gravel, and range from 0 to 15 percent by volume.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2. It is sand or loamy sand with 2 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction is slightly acid to neutral (pH 6.3 to 6.6).

The C horizon has dry color of 10YR 6/2, 6/3, 7/1, 7/2 or 7/3; moist color is 10YR 4/2, 4/3 or 5/2. It is coarse sand, sand, fine sand, loamy coarse sand or loamy sand, with 2 to 3 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction is neutral (pH 6.6 to 6.9).

Risue Family

The Risue family consists of shallow, well drained soils forming in residuum from basalt. These soils are on lava flows. Slope is 2 to 30 percent. Elevation is 6,700 to 7,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Clayey, montmorillonitic, mesic, shallow Abruptic Durargids.

Typical Pedon: The representative profile for this soil is on a north-facing lava flow, under Big Sagebrush and Rabbitbrush, at an elevation of 7,340 feet. Slope is 8 percent. When described (8/25/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) cobbly loamy sand, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, non-sticky and nonplastic; few very fine roots; common very fine tubular and interstitial pores; 10 percent gravel and 20 percent cobbles; neutral (pH 6.7); clear smooth boundary.

A12 - 2 to 6 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure, parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine tubular, and many very fine interstitial pores; 5 percent gravel; neutral (pH 6.8); abrupt irregular boundary.

B21t - 6 to 10 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure, parting to strong very fine and fine subangular blocky; slightly hard, firm, sticky and plastic; many very fine and few fine roots; many very fine and fine, and few coarse and medium tubular pores; many moderately thick clay films on ped faces, and common thin clay films in pores; 5 percent gravel; neutral (pH 6.6); clear smooth boundary.

B22t - 10 to 16 inches; brown (7.5YR 5/4) clay, dark

brown (7.5YR 4/4) moist; strong medium and coarse subangular blocky structure, parting to strong fine and medium angular blocky; hard, firm, sticky and plastic; few very fine roots; many very fine and fine, few coarse and medium tubular pores; many moderately thick clay films on ped faces and in pores; 10 percent gravel; neutral (pH 6.6); abrupt smooth boundary.

C1sim - 16 to 25 inches; strong brown (7.5YR 5/6) silica-cemented indurated pan, with a sandy clay loam texture, dark brown (7.5YR 4/4) moist; massive; very hard, firm, slightly sticky and slightly plastic; 5 percent gravel; neutral (pH 6.9).

The soil surface is covered with 10 percent gravel and 20 percent cobbles.

Type Location: About 0.25 mile east and 0.10 mile south of the northwest corner of Section 17, T2N., R.30E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Solum thickness and depth to the indurated pan is 16 inches. The mean annual soil temperature at the pan is 48 to 59°F. The soil moisture control section is 6 to 16 inches. It is usually dry in all parts from early February to late November. The textural control section is the argillic horizon. It is sandy clay loam or clay, with an average of 37 percent clay. Rock fragments average 8 percent by volume. The profile is neutral throughout (pH 6.6 to 6.9).

The A horizon has dry color of 10YR 6/3; moist color is 10YR 4/2 or 4/3. It is loamy sand with 2 percent clay. Rock fragments are 0 to 5 percent gravel and 0 to 20 percent cobbles by volume.

The Bt horizon has dry color of 10YR 5/4 or 7.5YR 5/4; moist color is 10YR 4/4 or 7.5YR 4/4. It is sandy clay loam or clay, with 30 to 40 percent clay. Rock fragments are 5 to 10 percent gravel by volume.

The Csim horizon has dry color of 7.5YR 5/6; moist color is 7.5YR 4/4. It is sandy clay loam with 26 percent clay. Rock fragments are 5 percent gravel by volume.

Sanpete Family

The Sanpete family consists of moderately deep, well drained soils forming in residuum from calcareous metasedimentary rocks, composed mainly of limestone and dolomite. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 4,700 to 7,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, carbonatic, mesic Xerollic Calciorthis.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine, Juniper, and Black Sagebrush, at an elevation of 7,720 feet. Slope is 45 percent. When described (4/30/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 2 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; violently effervescent lime pendants on undersides of rock fragments and violently effervescent, disseminated lime; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

B2 - 2 to 21 inches; light yellowish brown (10YR 6/4) very cobbly fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many very fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel and 35 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

C1ca - 21 to 24 inches; white (10YR 8/1) very cobbly fine sandy loam, very pale brown (10YR 7/3) moist; massive; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; many very fine interstitial pores; violently effervescent lime pendants on undersides of rock fragments and violently effervescent, disseminated lime; 5 percent gravel, 45 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 24 inches; hard calcareous metasedimentary rock.

The surface is covered with 30 percent cobbles.

Type Location: About 11.4 miles east on Waucoba Road, from its intersection with Westgard Road, then about 3.7 miles north on Loretto Road, from its intersection with Waucoba Road, then about 2.35 miles up jeep trail on the west side of the road, and about 530 feet east of the trail; about 530 feet east and 950 feet south of the northwest corner of the northeast quarter of Section 17, T.9S., R.36E., MDBM, Waucoba Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 21 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 24 inches. It is usually dry in all parts from early April to mid October. The textural control section is fine sandy loam with 7 to 14 percent clay. Rock fragments average 45 percent. Effervescence is strong to violent throughout. Reaction is moderately alkaline (pH 8.0) throughout.

Some pedons have thin O horizons.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is fine sandy loam with 7 to 12 percent clay. Rock fragments are 15 to 50 percent gravel and 0 to 5 percent cobbles by volume.

The B2 horizon has dry color of 10YR 6/4; moist color is 10YR 4/3 or 4/4. It is fine sandy loam with 12 to 14 percent clay. Rock fragments are 10 to 40 percent gravel, 5 to 35 percent cobbles and 0 to 5 percent stones. Calcium carbonate equivalent is 16 percent by the syringe method.

The Cca horizon has dry color of 10YR 7/3 or 8/1, 5Y 8/2 or 7.5Y 8/2; moist color is 10YR 7/3, 2.5Y 6/4, 5Y 6/3 or 7.5YR 7/4. It is fine sandy loam with 7 to 12 percent clay. Rock fragments are 5 to 46 percent gravel, 0 to 45 percent cobbles and 0 to 5 percent stones. Calcium carbonate equivalent is about 46 percent by the syringe method.

Simpson Family

The Simpson family consists of moderately deep, well drained soils forming in colluvium and residuum from andesite and rhyolite. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,800 to 8,300 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine, montmorillonitic, mesic Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,400 feet. When described (7/15/81), the soil was dry in the upper 8 inches and slightly moist in the rest of the profile. (Colors are for dry soil, unless otherwise noted.)

A11 – 0 to 2 inches; pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 30 percent gravel; neutral (pH 7.0); clear smooth boundary.

A12 – 2 to 8 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 20 percent gravel; mildly alkaline (pH 7.5); clear wavy boundary.

B2t – 8 to 15 inches; light yellowish brown (10YR 6/4) clay loam, strong brown (7.5YR 5.6) moist; moderate fine prismatic structure, parting to strong medium and coarse subangular blocky; hard, very friable, very sticky and very plastic; few very fine, fine and medium roots; few very fine and fine tubular pores; common pressure faces on ped faces; strongly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B3t – 15 to 23 inches; reddish yellow (7.5YR 6/6) cobbly clay loam, strong brown (7.5YR 5/6) moist; moderate fine, medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; few very fine, fine and medium roots; few very fine and

fine tubular pores; common pressure faces on ped faces; strongly effervescent, disseminated lime; 10 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt irregular boundary.

R – 23 inches; andesite bedrock, which is slightly weathered in the upper 1 inch.

The surface is covered with 30 percent gravel, 10 percent cobbles, and 30 percent stones.

Type Location: About 9.95 miles west on Trail Canyon Road, from its intersection with Highway 3A, and about 50 feet south of the road; about 0.3 mile west and 0.3 mile south of the northeast corner of Section 6, T.1S., R.34E., MDBM, Davis Mountain NW Quadrangle.

Range in Characteristics: Soil depth is 20 to 40 inches. The mean annual temperature at 20 inches is 47 to 59°F. The soil moisture control section is 5 to 20 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam or clay with 35 to 50 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 5 percent cobbles and 0 to 10 percent stones by volume, and average less than 34 percent.

Some pedons have transitional B1 horizons and some pedons are noncalcareous throughout.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is loamy sand, sandy loam or loam with 5 to 16 percent clay. Rock fragments are 20 to 30 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.5).

The Bt horizon has dry color of 10YR 6/4, or 7.5YR 6/3, 6/4 or 6/6; moist color is 7.5YR 4/3, 4/4 or 5/6. It is clay loam or clay with 30 to 50 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 15 percent cobbles and 0 to 10 percent stones by volume. Effervescence is none to strong. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Slinger Family

The Slinger family consists of moderately deep to deep, well drained soils forming in colluvium from granitic and sedimentary rocks. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 6,100 to 9,500 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed (calcareous), frigid Xeric Torriorthents.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,480 feet. Slope is 60 percent. When described (10/8/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

01 - 1 to 0 inch; organic mat, made up of pine needles, twigs and cones; clear wavy boundary.

A11 - 0 to 2 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12 - 2 to 5 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose, loose, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A13 - 5 to 14 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and common fine and medium roots; many very fine and fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C1ca - 14 to 18 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and common medium and coarse roots;

many very fine and fine interstitial pores; violently effervescent, disseminated lime; 55 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C2ca - 18 to 24 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel; moderately alkaline (pH 8.2); clear wavy boundary.

C3ca - 24 to 38 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 50 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.2); clear wavy boundary.

C4ca - 38 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium and common coarse roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 45 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.2).

The surface is covered with 30 percent gravel and 10 percent cobbles.

Type Location: About 1.95 miles southeast on Queen Canyon Road, from its intersection with Highway 395, then 0.5 mile southwest on jeep trail, then 0.65 mile southeast on southeast fork of trail and 0.3 mile upslope, in a southeasterly direction; about 0.15 mile east and 0.45 mile north of the southeast corner of Section 35., T.1N., R.32E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Soil depth is 35 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 37 inches. It is usually dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is sandy loam or loam, with 6 to 19 percent clay, and an average

of less than 18 percent. Rock fragments are 30 to 70 percent by volume and average about 59 percent.

Some pedons do not have an O horizon.

The O horizon is 1/2 to 1 inch thick.

The A horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or loam, with 8 to 19 percent clay. Rock fragments are 25 to 40 percent gravel, 5 to 20 percent cobbles and 0 to

10 percent stones by volume. Effervescence is slight to strong. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

The C horizon has dry color of 10YR 7/1, 7/2 or 7/3, or 5Y 8/1; moist color is 10YR 4/3, 4/4 or 5/3, or 2.5Y 4/3 or 5/2, or 5Y 6/2. It is sandy loam or loam, with 6 to 19 percent clay. Rock fragments are 30 to 65 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume. Effervescence is strong to violent. Reaction is moderately alkaline (pH 8.0 to 8.2).

Soakpak Family

The Soakpak family consists of moderately deep to deep, well drained soils forming in alluvium and colluvium from mixed granitic rocks. These soils are on remnant alluvial fans, in alluvial-colluvial flats and on mountain-sides. Slope is 5 to 60 percent. Elevation is 9,000 to 13,900 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 28°F.

Taxonomic Class: Loamy-skeletal, mixed Pergelic Cryochrepts.

Typical Pedon: The representative profile for this soil is on a south-facing remnant alluvial fan, under Carex, Low Phlox and Pringle Bluegrass, at an elevation of 13,200 feet. When described (7/17/80), the soil was dry throughout. (Colors are for day soil, unless otherwise noted.)

A11 - 0 to 3 inches; grayish brown (10YR 5/2) very cobbly loam, very dark gray (10YR 3/1) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine interstitial, and common very fine tubular pores; 20 percent gravel, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.5); clear smooth boundary.

A12 - 3 to 9 inches; brown (10YR 5/3) very gravelly sandy loam, very dark gray (10YR 3/1) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and common fine interstitial pores; 40 percent gravel; medium acid (pH 6.0); clear wavy boundary.

B21 - 9 to 13 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine, and few medium pores; common very fine, and few fine interstitial pores; 35 percent gravel; medium acid (pH 6.0); clear wavy boundary.

B22 - 13 to 27 inches; pale brown (10YR 6/3) very gravelly sandy loam, yellowish brown (10YR 5/4)

moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and few fine interstitial pores; 55 percent gravel; medium acid (pH 6.0); clear wavy boundary.

C1 - 27 to 42 inches; light gray (10YR 7/2) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine interstitial pores; 55 percent gravel; medium acid (pH 6.0); abrupt irregular boundary.

R - 42 inches; hard, fractured granodiorite.

The surface is covered with 15 percent gravel, 10 percent cobbles and 5 percent stones.

Type Location: About 2.7 miles north of the White Mountain Research Station and about 180 feet west of the road; about 0.3 mile south of the apparent center of Section 30, T.3S., R.34E., MDBM, White Mountain Peak NE Quadrangle.

Range in Characteristics: Soil depth is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is less than 32°F. The soil moisture control section is 4 to 30 inches. It is usually dry in all parts from mid April to late September, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam or loam, with 6 to 17 percent clay, and an average of about 11 percent. Rock fragments are 25 to 60 percent gravel, 0 to 15 percent cobbles and 0 to 30 percent stones by volume, and average 53 percent.

The A horizon has dry color of 10YR 5/2, 5/3 or 5/4; moist color is 10YR 3/1, 3/2, 3/3 or 4/3. It is loamy sand, sandy loam or loam, with 4 to 15 percent clay. Rock fragments are 15 to 70 percent gravel, 5 to 15 percent cobbles and 5 to 30 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The B2 horizon has dry color of 10YR 6/3 or 7/4; moist color is 10YR 3/3, 4/3 or 5/4. It is loamy sand, sandy loam or loam, with 6 to 17 percent clay. Rock fragments are 25 to 60 percent gravel, 0 to 15 percent cobbles and 0 to 10 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The C horizon has dry color of 10YR 7/2, 7/3 or 7/4, or 2.5Y 7/4; moist color is 10YR 4/3, 4/4 or 6/4, or 2.5Y 4/4. It is sandy loam with 6 to 16 percent clay. Rock fragments 35 to 55 percent gravel, 0 to 10 percent cobbles and 0 to 30 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

Spaa Family

The Spaa family consists of shallow, well drained soils forming in colluvium from rhyolite. These soils are on ridges and mountainsides. Slope is 5 to 60 percent. Elevation is 6,200 to 9,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountain ridge, under Curleaf Mountain Mahogany and Big Sagebrush, at an elevation of 9,120 feet. Slope is 40 percent. When described (11/7/81), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 – 0 to 3 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium and coarse platy structure; soft, very friable, non-sticky and nonplastic; many very fine and fine interstitial pores; 25 percent gravel and 20 percent cobbles; medium acid (pH 6.0); clear smooth boundary.

C1 – 3 to 8 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, non-sticky and nonplastic; few very fine and fine, and common medium roots; many very fine and fine interstitial pores; 10 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

C2 – 8 to 16 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine, medium and coarse roots; many very fine and fine interstitial pores; 20 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

R – 16 inches; Hard rhyolite.

The soil surface is covered with 25 percent gravel and 20 percent cobbles.

Type Location: About 6.8 miles east on Sugarloaf Road, from its intersection with Highway 395, at Montgomery Pass, then about 1.5 miles southeast of where the road deadends; about 1/4 mile west of the apparent center of Section 28, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 12 to 16 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is at 8 inches to the lithic contact. It is usually dry in all parts from mid April to late September, and moist in some or all parts the rest of the year. The textural control section is the whole soil for pedons 14 inches deep or shallower, or 10 to 16 inches for pedons 15 inches deep or deeper. It is loamy sand or sandy loam, with 2 to 7 percent clay. Rock fragments are 4 to 40 percent by volume, and average about 24 percent.

The A horizon had dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or sandy loam, with 2 to 6 percent clay. Rock fragments are 20 to 25 percent gravel and 20 percent cobbles by volume. Reaction is medium to slightly acid (pH 6.0 to 6.5).

The C horizon has dry color of 10YR 5/2, 5/3, 6/2 or 6/3, moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is sandy loam with 7 percent clay. Rock fragments are 4 to 25 percent gravel and 0 to 5 percent cobbles by volume. Reaction is slightly acid (pH 6.5).

Spanel Family

The Spanel family consists of shallow, well drained soils forming in alluvium from mixed calcareous rocks. These soils are on alluvial fans and terraces. Slope is 2 to 60 percent. Elevation is 4,100 to 7,100 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy, mixed, mesic, shallow Typic Durargids.

Typical Pedon: The representative profile for this soil is on a southwest-facing alluvial terrace, under Shadscale and Mormon Tea, at an elevation of 5,080 feet. When described (4/26/80), the soil was dry throughout. (Colors are for day soil unless otherwise noted.)

A11 - 0 to 1 inch; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate very thin and thin platy structure; soft, very friable, nonsticky and nonplastic; common fine roots; many medium vesicular pores; slightly effervescent, disseminated lime; 20 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); smooth clear boundary.

A12 - 1 to 3 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine roots; many fine vesicular pores; slightly effervescent, disseminated lime; 5 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B1t - 3 to 10 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and few medium roots; common medium vesicular pores; common thin clay films on ped faces; slightly effervescent, disseminated lime; 5 percent gravel; moderately alkaline (pH 8.0); gradual wavy boundary.

B2t - 10 to 19 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine vesicular and few fine tubular pores; common thin clay films on ped faces, and few moderately thick clay films in pores; slightly effervescent, dis-

seminated lime; 10 percent gravel and 1 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

Clsicam - 19 to 60 inches; light gray (10YR 7/2) indurated pan, grayish brown (10YR 5/2); moist; massive; extremely hard, troweled surface of laminar silica and calcium excluding root penetration; violently effervescent; moderately alkaline (pH 8.0).

The surface is covered with 10 percent cobbles.

Type Location: About 1.5 miles east of Waucoba Road, from its intersection with Westgard Road, then about 2.7 miles north on a jeep trail, and about 200 feet south of the trail; about 530 feet east and 925 feet north of the southwest corner of the northwest quarter of Section 6, T.9S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the indurated pan ranges from 8 to 19 inches. The mean annual soil temperature at the pan is 47 to 59°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from early February to late November. The control section is clay loam, loam, fine sandy loam or sandy loam, with 10 to 32 percent clay, and an average of 23 percent clay. Rock fragments range from 5 to 35 percent and average 18 percent by volume. The soil is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is loam, fine sandy loam or sandy loam, with 10 to 18 percent clay. Rock fragments are 5 to 25 percent gravel, 0 to 10 percent cobbles and 0 to 1 percent stones by volume. Effervescence is slightly to strong.

The Bt horizon has dry color of 10YR 5/4, 6/3 or 6/4; moist color is 10YR 4/3, 4/4 or 5/4. It is loam or clay loam with 20 to 32 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 5 percent cobbles by volume. Effervescence is slight to strong.

The Csicam horizon is massive, extremely hard and brittle. It is very difficult to dig through with hand tools and does not slake in concentrated HCL. The degree of induration usually decreases with increasing depth.

St. Marys Family

The St. Marys family consists of deep, well drained soils forming in colluvium from basalt. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 7,500 to 8,200 feet. The mean annual precipitation is about 11 inches, and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Typic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Big Sagebrush and Buckwheat, at an elevation of 8,000 feet. Slope is 40 percent. When described (8/24/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 3 inches; grayish brown (10YR 5/2) extremely stony loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure, parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; few very fine roots; many medium interstitial pores; 40 percent gravel, 20 percent cobbles and 20 percent stones; neutral (pH 7.0); clear wavy boundary.

A12 - 3 to 9 inches; brown (10YR 5/3) extremely stony loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; many medium interstitial pores; 45 percent gravel, 15 percent cobbles and 15 percent stones; neutral (pH 7.0); gradual wavy boundary.

B21 - 9 to 17 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many medium interstitial pores; 45 percent gravel; neutral (pH 7.0); gradual wavy boundary.

B22 - 17 to 26 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; hard, firm, slightly sticky and slightly plastic; many very fine and fine, and few medium and coarse roots; many medium interstitial

pores; 45 percent gravel; neutral (pH 7.0); gradual irregular boundary.

C1 - 26 to 38 inches; yellowish brown (10YR 5/4) extremely gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common medium interstitial pores; 65 percent gravel; neutral (pH 7.0); clear wavy boundary.

C2 - 38 to 60 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many medium interstitial pores; neutral (pH 7.0).

Type Location: About 0.2 mile west and 0.15 mile south of the northeast corner of Section 10, T.1N., R.31E., MDBM, Benton NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4 to 19 inches. It is usually dry in all parts from mid April to late September, and is usually moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loam or clay loam, with an average of about 27 percent clay. Rock fragments average about 50 percent by volume. The soil is neutral (pH 7.0) throughout the profile.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or loam, with 3 to 13 percent clay. Rock fragments are 40 to 45 percent gravel, 15 to 20 percent cobbles and 15 to 20 percent stones by volume.

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3 or 3/4. It is loam, with 15 to 18 percent clay. Rock fragments are 45 percent gravel by volume.

The C horizon has dry color of 10YR 5/4; moist color is 10YR 3/4. It is loam, with about 26 percent clay. Rock fragments are 0 to 65 percent gravel by volume.

Sumine Family

The Sumine family consists of moderately deep to deep, well drained soils forming in colluvium and residuum from sedimentary rocks, primarily shale and sandstone. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,200 to 10,000 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,640 feet. When described (5/18/80), the soil was dry throughout. (Colors are for day soil, unless otherwise noted.)

01 – 2 to 0 inches; slightly decomposed Pinyon Pine needles; abrupt smooth boundary.

A1 – 0 to 3 inches; dark grayish brown (10YR 4/2) gravelly fine sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; common fine interstitial pores; 15 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

B11t – 3 to 10 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium interstitial pores; few thin clay films on ped faces and bridging mineral sandgrains; 20 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B12t – 10 to 15 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium and strong fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium and coarse roots; few fine interstitial and common medium and coarse tubular pores; common thin clay films on ped faces and lining pores; 20 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B21t – 15 to 32 inches; light yellowish brown (10YR 6/4) very stony clay loam, dark yellowish brown (10YR

4/4) moist; moderate coarse subangular blocky structure, parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; few medium and coarse roots; common medium and coarse tubular pores; common thin and moderately thick clay films on ped faces and lining pores; 20 percent gravel, 15 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

B22t – 32 to 44 inches; light brown (7.5YR 6/4) cobbly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few medium roots; common medium tubular pores; common moderately thick clay films lining pores; 10 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B3t – 44 to 52 inches; light brown (7.5 YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, sticky and plastic; few medium roots; common fine tubular pores; common moderately thick clay films lining pores; 25 percent gravel, 5 percent cobbles and 5 percent stones; mildly alkaline (pH 7.5); abrupt irregular boundary.

R – 52 inches; hard fractured shale.

The surface is covered by 10 percent cobbles.

Type Location: About 13.7 miles east on Citrus Road, from its intersection with Highway 395, then about 4.25 miles north on Al Rose Canyon Trail, and about 0.1 mile west of trail; 1,160 feet east and 740 feet north of the southwest corner of the northwest quarter of Section 25, T.11S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Soil depth is 25 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean winter and mean summer soil temperatures differ by more than 9°F. The soil moisture control section is 5 to 15 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches, or from 10 inches to the lithic contact. Texture of the control section is clay loam or sandy clay loam with 20 to 36 percent clay, and averaging less than 35 percent. Rock fragments in the control section are 10 to 40 percent gravel, 10 to 35 percent cobbles and 0 to 15

percent stones by volume, and average about 37 percent. Reaction ranges from neutral (pH 6.9) to moderately alkaline (pH 8.0).

Some pedons have C horizons below the argillic horizon and are moderately deep to a paralithic contact. Other pedons do not have an O horizon. Many pedons lack transitional B1t and B3t horizons.

The O horizon is up to 2 inches thick.

The A horizon has dry color of 10YR 4/2; moist color is

10YR 2/2 or 3/2. It is fine sandy loam or loam, with 10 to 14 percent clay. Rock fragments are 15 to 35 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Reaction is neutral (pH 6.8 to 7.0).

The Bt horizon has dry color of 10YR 5/2, 5/3 or 6/4, or 7.5YR 6/4; moist color is 10YR 3/2, 3/3, 4/4 or 5/4. It is sandy clay loam or clay loam with 20 to 38 percent clay, and averages 21 to 33 percent clay. Rock fragments are 10 to 25 percent gravel, 5 to 35 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Supervisor Family

The Supervisor family consists of moderately deep to deep, well drained soils forming in colluvium from metasedimentary rocks. These soils are on mountainsides. Slope is 5 to 80 percent. Elevation is 8,800 to 12,600 feet. The mean annual precipitation is about 17 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy - skeletal, mixed Typic Cryoborolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Big Sagebrush and Lupine, at an elevation of 10,550 feet. Slope is 10 percent. When described (10/23/78), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine and fine subangular blocky structure, parting to weak fine granular; soft, friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 20 percent gravel; neutral (pH 6.7); clear smooth boundary.

A12 - 4 to 13 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine interstitial pores; 35 percent gravel; neutral (pH 6.8); clear smooth boundary.

C1 - 13 to 37 inches; very pale brown (10YR 7/3) extremely gravelly clay loam, dark brown (10YR 3/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; 70 percent gravel, 15 percent cobbles and 2 percent stones; neutral (pH 6.9); gradual irregular boundary.

C2 - 37 to 60 inches; very pale brown (10YR 7/4) extremely cobbly clay loam, light olive brown (2.5Y 5/4) moist; massive; hard, firm, sticky and plastic; many very fine interstitial pores; 40 percent gravel, 30 percent cobbles and 3 percent stones; neutral (pH 6.6).

The soil surface is covered with 60 percent gravel.

Type Location: North on the Bristlecone Road, about 660 feet past the Silver Canyon turnoff, and about 330 feet west of the road; about 2,150 feet west of the northeast corner of Section 24, T.6S., R.34E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Soil depth ranges from 30 to 60 inches. The mean annual soil temperature at 20 inches is about 33°F., and the mean summer soil temperature is about 37°F. The soil moisture control section is 8 to 50 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The 10 to 40 inch textural control section is loam or clay loam, with 14 to 32 percent clay and an average of 28 percent. Rock fragments are 20 to 70 percent gravel, 10 to 60 percent cobbles and 0 to 10 percent stones by volume, and average about 78 percent.

Some pedons have a B2 horizon and lack an A12 horizon. Some pedons have 0 horizons.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2 or 3/3. It is loam with 10 to 27 percent clay and contains 10 to 40 percent gravel and 0 to 30 percent cobbles. Reaction is neutral to slightly acid (pH 6.5 to 7.0).

The C horizon has dry color of 10YR 6/3, 6/4, 7/3 or 7/4, or 2.5Y 6/3; moist color is 10YR 3/3 or 4/4, or 2.5Y 5/4 or 4/4. It is loam or clay loam with 14 to 31 percent clay and contains 20 to 70 percent gravel, 10 to 60 percent cobbles and 0 to 10 percent stones. Reaction is slightly acid to moderately alkaline (pH 6.6 to 8.0).

Swift Creek Family

The Swift Creek family consists of moderately deep, well drained soils forming in colluvium from dolomite. These soils are on mountainsides. Slope is 15 to 30 percent. Elevation is 10,000 to 11,700 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy-skeletal, carbonatic Typic Cryorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Buckwheat and Bluegrass, at an elevation of 11,400 feet. Slope is 19 percent. When described (7/15/80), the soil was dry in the upper 4 inches and slightly moist throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 4 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and common fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12ca – 4 to 7 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 30 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1ca – 7 to 15 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 35 percent gravel and 25 percent cobbles; moderately alkaline (pH 8.0) gradual wavy boundary.

C2ca – 15 to 35 inches; very pale brown (10YR 7/4) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 40 percent gravel and 35 percent cobbles; moderately alkaline (pH 8.0); abrupt irregular boundary.

R – 35 inches; Fractured Dolomite.

The soil surface is covered with 5 percent gravel and 50 percent cobbles.

Type Location: About 7.85 miles north on the Ancient Bristlecone Road, from its intersection with Wyman Canyon Road, then 0.65 mile east of Eva Belle Mine Road, north of the Patriarch Grove, and 0.2 mile southeast of the road; about 1,475 feet east and 2,530 feet south of the northwest corner of Section 1, T.5S., R.34E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 21 to 40 inches. The mean annual soil temperature at 20 inches is about 37°F., and the mean summer temperature is about 58°F. The soil moisture control section is from 8 inches, to the lithic contact. It is usually dry in all parts from early April to mid October. The textural control section is from 10 inches to the lithic contact. It is sandy loam with 6 to 7 percent clay. Rock fragments average about 60 percent by volume. They are dolomite rock fragments. The soil is mildly to moderately alkaline throughout (pH 7.8 to 8.0). Effervescence is strong to violent throughout. Depth to secondary carbonates in the form of pendants on the undersides of rock fragments is 4 inches.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam with 7 to 8 percent clay. Rock fragments are 25 to 30 percent gravel and 15 to 20 percent cobbles by volume.

The C horizon has dry color of 10YR 6/4 or 7/4; moist color is 10YR 4/4 or 5/4. It is sandy loam with 6 to 7 percent clay. Rock fragments are 35 to 40 percent gravel and 25 to 35 percent cobbles by volume.

Theriot Family

The Theriot family consists of shallow, well drained soils forming in colluvium and residuum from limestone and dolomite rocks. These soils are on mountainsides and ridges. Slope is 15 to 80 percent. Elevation is 4,100 to 8,500 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, carbonatic, mesic Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,000 feet. Slope is 15 percent. When described (5/12/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; slightly effervescent, disseminated lime; 25 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

A12 - 3 to 6 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 15 percent gravel and 36 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 6 inches; hard limestone.

The soil surface is covered with 30 percent cobbles and 20 percent stones.

Type Location: Approximately 350 feet east and 175 feet south of the apparent center of the southwest quarter of Section 8, T.9S., R.36E., MDBM, Waucoba Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 6 to 18 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 4 to 18 inches. It is usually dry in all parts from early February to late November. The textural control section is all of the soil profile for pedons less than 14 inches deep, and 10 to 18 inches for pedons deeper than 14 inches. It is sandy loam, fine sandy loam, loam or sandy clay loam, with 4 to 22 percent clay and an average of 13 percent. Rock fragments are 15 to 40 percent gravel, 0 to 36 percent cobbles and 0 to 10 percent stones by volume, and average about 42 percent. Reaction is moderately alkaline (pH 8.0) throughout, and effervescence ranges from slight to violent.

Some pedons have C horizons.

The A horizon has dry color of 10YR 5/3, 6/3 or 6/4; moist color is 10YR 3/2, 3/3 or 4/3. It is sandy loam, fine sandy loam or loam, with 5 to 22 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 36 percent cobbles and 0 to 10 percent stones by volume.

Toeja Family

The Toeja family consists of moderately deep, well drained soils forming in colluvium and residuum from igneous rocks. These soils are on mountainsides, mountain tops and benches on mountainsides. Slope is 15 to 70 percent. Elevation is 6,600 to 9,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine-loamy, mixed, frigid Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Singleleaf Pinyon Pine, Curlleaf Mountain Mahogany and Big Sagebrush, at an elevation of 8,380 feet. Slope is 25 percent. When described (9/30/80), the soil was dry in the upper 8 inches and slightly moist in the lower 14 inches. (Colors are for day soil, unless otherwise noted.)

01 – 1 to 0 inch; organic mat made up of undecomposed pine needles, twigs and cones; abrupt broken boundary.

A11 – 0 to 2 inches; light brownish gray (10YR 6/2) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak very thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine and common fine and medium roots; many very fine and fine interstitial, and common fine tubular pores; 25 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

A12 – 2 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 15 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

A13 – 8 to 12 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 20

percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

B2t – 12 to 22 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium and coarse roots; few very fine and fine interstitial, and common very fine and fine tubular pores; common thick and moderately thick clay films on ped faces and in pores; 30 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

Cr – 22 inches, weathered rhyolite, which can be cut with a tile spade, but still retains its original rock structure.

The soil surface is covered with 25 percent gravel and 15 percent cobbles.

Type Location: About 3.9 miles east on Sugarloaf Road, from its intersection with Highway 395 at Montgomery Pass, and 265 feet north of the road; about 790 feet west, and 370 feet south of the northeast corner of Section 16, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the paralithic or lithic contact is 21 to 24 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is from 8 inches to the contact. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is loam or clay loam with 15 to 34 percent clay, and an average of 30 percent. Rock fragments range from 10 to 30 percent by volume, and average 18 percent.

Some pedons have transitional B1 horizons between the surface layer and argillic horizon.

The O horizon is 1 to 2 inches thick.

The A horizon has dry color of 10YR 5/2, 5/3 or 6/2; moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is sandy loam or loam with 4 to 9 percent clay. Rock fragments are 0 to 25 percent gravel, 0 to 30 percent cobbles and 0 to 20 percent stones by volume. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The B horizon has dry color of 10YR 4/3, 5/2, 5/4, 6/3, 6/4 or 7/4; moist color is 10YR 3/2, 3/3, 4/3, 4/4, 5/4

or 5/6. It is loam, sandy clay loam or clay loam, with 11 to 34 percent clay. Rock fragments are 0 to 30 percent gravel, 0 to 15 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.7 to 8.0).

The contact is lithic or paralithic rhyolite, andesite, basalt or slate.

Trocken Family

The Troken family consists of moderately deep to deep, well drained soils forming in colluvium and alluvium from mixed rocks. These soils are on sideslopes of alluvial fans. Slope is 2 to 80 percent. Elevation is 3,800 to 8,000 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed (calcareous), mesic Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a north-facing alluvial fan sideslope, under Big Sagebrush and Greenfire, at an elevation of 6,850 feet. Slope is 35 percent. When described (5/4/80), the soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and common medium roots; many fine interstitial pores; slightly effervescent, disseminated lime; 35 percent gravel, 5 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); smooth gradual boundary.

A12 - 3 to 9 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel, 10 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); smooth gradual boundary.

C1 - 9 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; few fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel, 15 percent cobbles and 2 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 15 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 0.95 mile south on jeep trail on the south side of the road, then about 300 feet upslope, on the east side of the jeep trail; about 900 feet west and 250 feet south of the northeast corner of the southeast quarter of Section 35, T.9S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is 24 to greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 36 inches. It is usually dry in all parts from early February to late November. The textural control section is 10 to 40 inches. It is very coarse sandy loam, coarse sandy loam, sandy loam, fine sandy loam or loam, with 5 to 14 percent clay, and an average of about 9 percent. Rock fragments average about 44 percent by volume. Reaction is moderately alkaline (pH 8.0) throughout the soil profile.

The A horizon has dry color of 10YR 5/2, 6/2, 6/3 or 7/2, or 2.5Y 6/2 or 5Y 6/2; moist color is 10YR 3/2, 4/2, 5/2, or 4/3 or 2.5Y 5/2, or 5Y 4/2. It is sandy loam, fine sandy loam, coarse sandy loam or loamy sand, with 5 to 12 percent clay. Rock fragments are 20 to 50 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Effervescence is slight to violent.

The C horizon has dry color of 10YR 6/3, 6/4, 7/2 or 7/4, or 2.5Y 7/2, or 5Y 7/2 or 7/3; moist color is 10YR 4/3, 5/2, 5/3 or 5/4, or 2.5Y 5/2 or 5Y 5/3. It is very coarse sandy loam, coarse sandy loam, sandy loam or fine sandy loam, with 5 to 14 percent clay. Rock fragments are 25 to 60 percent gravel, 0 to 35 percent cobbles and 0 to 25 percent stones by volume. Effervescence is slight to violent, and some pedons have lime pendants on the undersides of rock fragments.

Tweedy Family

The Tweedy family consists of moderately deep, well drained soils forming in residuum from basalt. These soils are on basalt flow tops. Slope is 1 to 9 percent. Elevation is 7,000 to 8,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Typic Argixerolls.

Typical Pedon: The representative profile for this soil is on a bench top, under Juniper and Singleleaf Pinyon Pine, at an elevation of 7,220 feet. Slope is 2 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 2 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.7); clear smooth boundary.

A12 – 2 to 7 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure, parting to weak fine granular; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; neutral (pH 6.7); gradual wavy boundary.

B1 – 7 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; few fine and medium roots; few very fine and fine tubular pores; neutral (pH 6.7); abrupt wavy boundary.

B2t – 11 to 21 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium and coarse subangular blocky structure, parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; few very fine roots; few very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 20 percent gravel and 5 percent cobbles; neutral (pH 6.6); clear wavy boundary.

B3t – 21 to 32 inches; yellowish brown (10YR 5/4) gravelly sandy loam, brown (10YR 4/3) moist; strong medium subangular blocky structure, parting to weak very fine and fine subangular blocky; hard, friable, slightly sticky and slightly plastic; few very fine and fine tubular pores; common moderately thick clay films on ped faces, and common thin clay films in pores; 25 percent gravel; neutral (pH 6.7); gradual wavy boundary.

C1 – 32 to 38 inches; pale brown (10YR 6/3) very gravelly sand, brown (10YR 4/3) moist; massive; very hard, very firm, nonsticky and nonplastic; many very fine and few fine interstitial pores; 40 percent gravel; neutral (pH 6.7).

R – 38 inches; hard basalt.

The soil surface is covered with 5 percent gravel.

Type Location: About 22.2 miles northeast on Highway 167, from its intersection with Highway 395, then 5.2 miles south on dirt road, and 0.45 mile east of the road; the northwest corner of Section 26, T.3N., R.29E., MDBM, Trench Canyon SE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 18 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam with 28 to 33 percent clay. Rock fragments are 25 percent by volume.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2 or 3/3. It is sandy loam with 2 to 4 percent clay. Rock fragments are 0 to 5 percent gravel by volume. Reaction is neutral (pH 6.7).

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or clay loam, with 19 to 33 percent clay. Rock fragments are 0 to 25 percent gravel and 0 to 5 percent cobbles by volume. Reaction is neutral (pH 6.6 to 6.7).

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is sand with 2 percent clay. Rock fragments are 40 percent gravel by volume. Reaction is neutral (pH 6.7).

Typic Haplargids

These Typic Haplargids consist of moderately deep to deep, well drained soils forming in residuum from rhyolitic tuff. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,100 to 9,600 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine, montmorillonitic, frigid Typic Haplargids.

Reference Pedon: The representative profile for this soil is on a north-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,680 feet. Slope is 35 percent. When described (11/4/80), the soil was moist or slightly moist in the 2 to 15 inch part, and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 2 inches; variegated light reddish brown (5YR 6/3) and white (5YR 8/1) very gravelly clay loam, brown (10YR 5/3) and pinkish gray (5YR 7/2) moist; weak very fine and fine subangular blocky structure; soft, very friable, sticky and plastic; few very fine roots; few very fine and fine interstitial, and common very fine tubular pores; 40 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B21t – 2 to 9 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 4/4) moist; moderate medium prismatic structure, parting to strong medium and coarse subangular blocky; hard, firm, very sticky and very plastic; common very fine, fine and medium roots; few very fine tubular pores; common pressure faces; slightly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B22t – 9 to 15 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 5/4) moist; moderate medium prismatic structure; hard, firm, very sticky and very plastic; few very fine and fine and common medium roots; few very fine tubular pores; common pressure faces; strongly effervescent, disseminated lime; moderately alkaline (pH 8.0); clear irregular boundary.

C1ca – 15 to 23 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, very friable, sticky and plastic; few very fine and fine and common medium roots; common

very fine and fine interstitial, and few very fine tubular pores; violently effervescent lime in common irregular concretions; moderately alkaline (pH 8.2); clear wavy boundary.

C2ca – 23 to 43 inches; variegated pinkish gray (7.5YR 6/2) and white (N8/) very gravelly loam, brown (7.5YR 5/2) and pinkish white (7.5YR 8/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; violently effervescent lime in common irregular concretions; 50 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

Cr – 43 inches; rhyolite tuff, which can be cut with a knife, but retains its original rock structure.

The surface is covered with 40 percent gravel and 10 percent cobbles.

Type Location: About 10.6 miles west on Trail Canyon Road, from its intersection with Nevada Highway 3A, on the south shoulder of the road; about 330 feet east and 0.4 mile south of the northwest corner of Section 6, T.1S., R.34E., MDBM, Davis Mountain NW Quadrangle.

Range in Characteristics: Soil depth is 22 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October, and moist in some or all parts the rest of the year. The control section is the argillic horizon. It is clay loam, sandy clay or clay with an average of 35 to 45 percent clay. Rock fragments are 0 to 10 percent gravel and 0 to 5 percent cobbles.

Some pedons lack secondary carbonates and lime creations. Some pedons have a transitional B1 horizon.

The A horizon has dry color of 5YR 6/3 or 8/1, or 10YR 5/3; moist color is 10YR 3/2, 3/3 or 5/3, or 5YR 7/2. It is coarse sandy loam, sandy loam or clay loam with 8 to 30 percent clay. Rock fragments are 5 to 40 percent gravel and 0 to 10 percent cobbles by volume. Reaction is mildly alkaline (pH 7.5 to 7.8).

The Bt horizon has dry color of 5YR 6/4, 10YR 5/4 or 2.5Y 5/4; moist color is 5YR 4/4 or 5/4, or 10YR 4/3, 4/4 or 5/3. It is clay loam, sandy clay or clay with 30 to 45 percent clay. Rock fragments are 0 to 10 percent gravel and 0 to 5 percent cobbles by volume. Effervescence is none to strong. Reaction is mildly to moderately alkaline (pH 7.8 to 8.1).

7.5YR 5/4 or 6/2, or N8/; moist color is 10YR 3/3 or 5/6, or 5YR 3/4, or 7.5YR 5/2 or 8/2. It is loam or sandy clay loam with 10 to 35 percent clay. Rock fragments are 0 to 50 percent gravel and 0 to 10 percent cobbles by volume. Effervescence is none too violent. Reaction is mildly to moderately alkaline (pH 7.5 to 8.2).

The C horizon has dry color of 10YR 5/4 or 5/6, or

Typic Xerorthents

These Typic Xerorthents consist of deep, well drained soils forming in alluvium from mixed rocks. These soils are in depressions. Slope is 2 to 15 percent. Elevation is 6,700 to 7,800 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Coarse-loamy, mixed, nonacid, mesic Typic Xerorthents.

Reference Pedon: The representative profile for this soil is in an alluvial depression, under Saltgrass and Rabbitbrush, at an elevation of 7,200 feet. Slope is 2 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 1 inch; light brownish gray (10YR 6/2) gravelly sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 15 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

A12 – 1 to 4 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; weak very fine subangular blocky structure, parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common medium interstitial pores; 10 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

C1 – 4 to 12 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine roots; few medium interstitial pores; 5 percent gravel; neutral (pH 6.7); gradual wavy boundary.

C2 – 12 to 24 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure, parting to weak fine subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; 15 percent gravel; neutral (pH 7.0); gradual smooth boundary.

C3 – 24 to 36 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure, parting to moderate very fine and fine subangular blocky; hard, very friable, nonsticky and nonplastic; few very fine roots; many medium interstitial and tubular pores; 20 percent gravel; neutral (pH 6.8); clear wavy boundary.

C4 – 36 to 60 inches; pale brown (10YR 6/3) very cobbly loamy sand, brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; many medium interstitial pores; 30 percent gravel and 20 percent cobbles; neutral (pH 6.6).

The soil surface is covered with 15 percent gravel.

Type Location: About 16.5 miles northeast on Highway 167, from its intersection with Highway 395, then 9.6 miles southeast on dirt road, then 0.75 mile east on the east fork of the dirt road, and 0.2 mile south of the road; the apparent center of Section 14, T.2N., R.29E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 42 inches. It is dry in all parts from June 1 to mid August, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loamy sand or sandy loam with 2 to 3 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 20 percent cobbles by volume, and average 21 percent.

The A horizon has dry color of 10YR 6/2; moist color is 10YR 4/2 or 4/3. It is sand or loamy sand with 1 to 2 percent clay. Rock fragments are 10 to 15 percent gravel by volume. Reaction is slightly acid (pH 6.4).

The C horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/3. It is loamy sand or sandy loam with 2 to 3 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 20 percent cobbles by volume. Reaction is neutral (pH 6.6 to 7.0).

Unionville Family

The Unionville family consists of moderately deep and deep, well drained soils forming in alluvium from mixed sedimentary rocks or in colluvium from basalt. These soils are on alluvial fans, valley bottoms and basalt flows. Slope is 3 to 30 percent. Elevation is 6,000 to 8,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Coarse-loamy, mixed, mesic Typic Camborthids.

Typical Pedon: The representative profile for this soil is on a northwest-facing alluvial fan, under Juniper and Big Sagebrush, at an elevation of 7,280 feet. When described (5/3/80), the soil was moist in the upper 38 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted).

A1 – 0 to 4 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; common fine vesicular pores; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

B2 – 4 to 26 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); gradual smooth boundary.

B3ca – 26 to 38 inches; pale brown (10YR 6/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few medium roots; common fine interstitial pores; violently effervescent, disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

C1ca – 38 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, nonsticky and nonplastic; few fine intersitital pores; violently effervescent, disseminated lime; 32 percent gravel and 2 percent cobbles; moderately alkaline (pH 8.0).

The surface is covered by 2 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 4.2 miles south on a jeep trail on the south side of the road, staying on the westerly forks of the trail, then about 50 feet east of the jeep trail, in the southwest end of Harkless Flat; about 0.3 mile west and 0.35 mile south of the northeast corner of Section 9, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is 35 to 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 9 to 26 inches. It is usually dry in all parts from early April to mid October. Effervescence ranges from noneffervescent to violently effervescent. The control section is sandy loam with 4 to 16 percent clay, and an average of 12 percent. Rock fragments range from 5 to 17 percent, and average about 14 percent.

Some pedons do not have B3ca horizons.

The A horizon has dry color of 10YR 5/3 or 7.5YR 5/2; moist color is 10YR 3/3 or 4/3, or 7.5YR 3/2. It is sandy loam with 4 to 10 percent clay. Rock fragments are 10 to 33 percent gravel and 0 to 12 percent cobbles by volume. It is noneffervescent to slightly effervescent. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The B2 horizon has dry color of 10YR 6/3 or 7.5YR 5/3; moist color is 10YR 4/3 or 4/4, or 5YR 3/4. It is sandy loam with 9 to 16 percent clay. Rock fragments are 10 to 20 percent gravel by volume. Effervescence is none to slight. Reaction is neutral to moderately alkaline (pH 6.7 to 8.0).

The B3ca horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 4/4. It is sandy loam with 15 to 20 percent gravel and 2 percent cobbles. Clay content is 10 to 14 percent. It is strongly to violently effervescent. Reaction is moderately alkaline (pH 8.0).

The C1ca horizon has dry color of 10YR 6/4 or 7/4, or 7.5YR 5/4, or 5YR 5/3; moist color is 10YR 4/4 or 5/4, or 5YR 3/3, or 2.5YR 3/4. It is sandy loam with 3 to 10 percent clay. Rock fragments are 0 to 32 percent gravel and 0 to 5 percent stones by volume. Effervescence is none to violent and reaction is neutral to moderately alkaline (pH 6.6 to 8.0).

Vipont Family

The Vipont family consists of deep, well drained soils forming in colluvium from andesite and rhyolite. These soils are on mountainsides. Slope is 60 to 70 percent. Elevation is 8,000 to 9,900 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Pachic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Big Sagebrush, Ephedra and Bluegrass, at an elevation of 8,800 feet. Slope is 65 percent. When described (9/26/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 6 inches; grayish brown (10YR 5/2) extremely cobbly loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 11 percent gravel, 50 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

A12 – 6 to 12 inches; brown (10YR 5/3) cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 5 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); gradual wavy boundary.

A13 – 12 to 17 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine and fine interstitial pores; 10 percent gravel and 40 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B1 – 17 to 24 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium and coarse roots; common very fine and fine interstitial, and few very fine and fine tubular pores; 15 percent gravel and 40 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B2t – 24 to 35 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and common medium and coarse roots; few very fine and fine interstitial, and common very fine and fine tubular pores; few thin and moderately thick clay films bridging mineral sand grains and in pores; 40 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1 – 35 to 48 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, secondary lime coatings on the undersides of 25 percent of the rock fragments; 20 percent gravel and 65 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C2 – 48 to 60 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, secondary lime coatings on the undersides of 25 percent of the rock fragments; 30 percent gravel, 30 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent gravel, 45 percent cobbles and 15 percent stones.

Type Location: About 5.45 miles east on Sugarloaf Road, from its intersection with Highway 395, at Montgomery Pass, and 0.3 mile east of the road; about 800 feet east and 425 feet south of the apparent center of Section 21, T.1N., R.33E., MDBM, Benton NE Quad-range.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 36 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam with 33 percent clay. Rock fragments average 50 percent

by volume. The soil is moderately alkaline (pH 8.0) throughout. Depth to secondary lime accumulations is 35 inches.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2. It is loamy sand or sandy loam with 2 to 7 percent clay. Rock fragments are 5 to 11 percent gravel, 15 to 50 percent cobbles and 0 to 20 percent stones by volume.

The B horizon has dry color of 10YR 6/4; moist color is 10YR 4/4. It is clay loam with 30 to 35 percent clay. Rock fragments are 40 percent gravel and 10 percent cobbles by volume.

The C horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 4/3 or 4/4. It is sandy loam with 7 percent clay. Rock fragments are 20 to 30 percent gravel, 30 to 65 percent cobbles and 0 to 10 percent stones by volume.

Washoe Family

The Washoe family consists of moderately deep to deep, well drained soils forming in colluvium and residuum from rhyolite, siltstone and shale. These soils are on mountainsides and older stabilized alluvial fans. Slope is 3 to 60 percent. Elevation is 5,500 to 8,500 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,870 feet. Slope is 50 percent. When described (11/6/80), the soils was slightly moist from 4 to 19 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 4 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak very thin platy structure, parting to granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine interstitial pores; 50 percent gravel; neutral (pH 7.0); clear wavy boundary.

B21t - 4 to 7 inches; light brown (7.5YR 6/4) very gravelly clay loam, brown (7.5YR 4/4) moist; massive; hard, friable, very sticky and plastic; few very fine and fine, and common medium and coarse roots; few very fine interstitial and common very fine and fine tubular pores; common thin and moderately thick clay films lining pores and on clod faces; 30 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

B22t - 7 to 19 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial and common very fine and fine tubular pores; common thin and moderately thick clay films lining pores and on clod faces; 50 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C1ca - 19 to 28 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and

fine interstitial pores; strongly effervescent, disseminated lime; 55 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); gradual wavy boundary.

C2ca - 28 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive, soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0).

The surface is covered with 80 percent gravel and 10 percent cobbles.

Type Location: About 7.0 miles west on Middle Creek Road, from its intersection with the Nevada Highway 3A, then about 3.35 miles north on Trail Canyon Fork, and about 225 feet upslope, on the north side of the road; about 0.15 mile east and 0.15 mile north of the southwest corner of Section 1, T.1S., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Soil depth is 23' to greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The textural control section includes all of the argillic. It is coarse sandy loam, loam, sandy clay loam or clay loam with 17 to 35 percent clay, and an average of 27 percent. Rock fragments are 30 to 53 percent gravel, 0 to 15 percent cobbles and 0 to 15 percent stones by volume, and average 53 percent.

Some pedons have B1, B1t, B3 or B3t transitional horizons. Some pedons lack C horizons.

The A horizon has dry color of 10YR 5/3, 6/2 or 6/3; moist color is 10YR 3/3, 4/2 or 4/3. It is sandy loam or loam with 6 to 20 percent clay. Rock fragments are 5 to 50 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The Bt horizon has dry color of 10YR 5/3, 5/4 or 6/4, or 7.5YR 6/4, 6/6 or 7/4; moist color is 10YR 3/3, 4/3, 4/4, 5/3 or 5/4, or 7.5YR 4/4, or 5YR 4/6. It is coarse sandy loam, loam, sandy clay loam or clay loam with 17 to 35 percent clay. Rock fragments are 25 to 55 percent gravel, 0 to 15 percent cobbles and 0 to 15 percent stones

by volume. Reaction is slightly acid to mildly alkaline (pH 6.5 to 7.6).

The Cca horizon has dry color of 10YR 6/3, 6/4, 7/2 or 7/3; moist color is 10YR 4/4, 5/3 or 5/4. It is

coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to 10 percent clay. Rock fragments are 40 to 60 percent gravel, 5 to 30 percent cobbles and 0 to 10 percent stones by volume. Effervescence is noneffervescent to violently effervescent. Reaction is moderately alkaline (pH 8.0).

Wenzel Family

The Wenzel family consists of moderately deep, well drained soils forming in colluvium from siltstone and shale. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 7,400 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Clayey-skeletal, mixed, frigid Typic Argixerolls.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Curlleaf Mountain Mahogany and Big Sagebrush, at an elevation of 9,520 feet. Slope is 60 percent. When described (7/29/80), the soil was dry in the upper 4 inches and slightly moist throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 4 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine, fine and medium interstitial pores; 30 percent gravel; moderately alkaline (pH 8.2); abrupt smooth boundary.

B1 – 4 to 7 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, sticky and plastic; common very fine, fine and medium roots; many very fine and fine interstitial pores; 50 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

B21t – 7 to 12 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; strong fine and medium angular blocky structure; hard, friable, sticky and plastic; few very fine, fine and medium roots; few very fine and fine interstitial, and common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 4 percent soft gypsum masses, 1 to 2 millimeters in size; 45 percent gravel; mildly alkaline (pH 7.8); gradual wavy boundary.

B22t – 12 to 29 inches; brown (7.5YR 5/4) very gravelly

clay, dark brown (7.5YR 4/4) moist; strong fine and medium angular blocky structure; hard, friable, very sticky and very plastic; few very fine, fine, medium and coarse roots; few very fine and fine interstitial, and few fine tubular pores; many thick clay films on ped faces and in pores; 4 percent soft gypsum masses, 1 to 2 millimeters in size; 35 percent gravel; mildly alkaline (pH 7.8); abrupt wavy boundary.

R – 29 inches; hard, fractured siltstone.

The soil surface is covered with 25 percent gravel, 20 percent cobbles and 5 percent stones.

Type Location: About 5.35 miles east, on the North Fork Crooked Creek Road, from its intersection with the Ancient Bristlecone Road, and about 780 feet upslope, on the north side of the road; about 265 feet east and 1,215 feet north of the southwest corner of Section 24, T.5S., R.35E., MDBM, Blanco Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 30 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 7 to 28 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam or clay, with 30 to 43 percent clay and an average of about 40 percent. Rock fragments are 35 to 45 percent by volume and average about 38 percent.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is sandy loam or fine sandy loam with 9 to 18 percent clay. Rock fragments are 20 to 30 percent gravel and 0 to 5 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0 to 8.2).

The B horizon has dry color of 10YR 5/4, or 7.5YR 5/4 or 7/6; moist color is 10YR 3/4, or 7.5YR 4/4 or 5/6. It is clay loam or clay with 30 to 43 percent clay. Rock fragments are 35 to 40 percent gravel and 0 to 5 percent cobbles by volume. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

Wrango Family

The Wrango family consists of deep, well drained soils forming in alluvium from mixed rocks. These soils are on dissected alluvial fans and terraces. Slope is 3 to 15 percent. Elevation is 5,000 to 8,500 feet. The mean annual precipitation is about 7 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Sandy-skeletal, mixed, mesic Xeric Torriorthents.

Typical Pedon: The representative profile for this soil is on an east-facing dissected alluvial terrace, under Big Sagebrush, Nevada Ephedra and Needlegrass, at an elevation of 7,480 feet. Slope is 8 percent. When described (7/15/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 3 inches; light brownish gray (10YR 6/2) gravelly loamy sand, dark grayish brown (10YR 4/2) moist; weak thin and medium platy structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 19 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

C1 – 3 to 17 inches; brown (10YR 5/3) gravelly loamy sand, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 15 percent gravel and 3 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C2 – 17 to 39 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; massive; very hard, firm, nonsticky and nonplastic; common very fine and fine, and few medium roots; common very fine interstitial pores; 55 percent gravel and 18 percent stones; mildly alkaline (pH 7.8); gradual wavy boundary.

C3 – 39 to 50 inches; very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; massive; hard, firm, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial pores; 35 percent gravel and 3 percent stones; mildly alkaline (pH 7.4); clear wavy boundary.

C4ca – 50 to 60 inches; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 3/3) moist; massive; hard, firm, nonsticky and nonplastic; common very fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; moderately alkaline (pH 8.4).

The soil surface is covered with 40 percent gravel.

Type Location: About 7.2 miles west on Trail Canyon Road, from its intersection with Nevada Highway 3A, then about 1.5 miles west on Middle Canyon Road, and 130 feet north of the road; about 175 feet east and 0.5 mile south of the northwest corner of Section 19, T.1S., R.34E., MDBM, Davis Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 52 inches. It is usually dry in all parts from early April to mid October. The textural control section is 10 to 40 inches. It is loamy coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to 8 percent clay, and an average texture of loamy sand. Rock fragments are 18 to 90 percent by volume and average about 63 percent. Depth to calcium carbonates is 11 to 50 inches.

The A horizon has dry color of 10YR 5/3, 6/2, 6/3 or 7/3; moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is loamy sand with 3 to 7 percent clay. Rock fragments are 5 to 33 percent gravel and 0 to 5 percent cobbles by volume. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The C horizon has dry color of 10YR 4/3, 5/3, 6/3, 6/4, 7/3, 7/4 or 8/1, or 7.5YR 6/4, or 5YR 6/6; moist color is 10YR 3/3, 4/3, 4/4, 5/3 or 5/4, or 7.5YR 5/4, or 5YR 5/6. It is loamy coarse sand, loamy sand, coarse sandy loam or sandy loam with 2 to 11 percent clay. Rock fragments are 15 to 60 percent gravel, 0 to 25 percent cobbles and 0 to 25 percent stones by volume. Effervescence is none to strong. Reaction is neutral to moderately alkaline (pH 7.0 to 8.4).

Yuko Family

The Yuko family consists of shallow, moderately well drained soils forming in residuum from granodiorite and granite. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 4,700 to 8,200 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy, mixed, mesic, shallow Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Big Sagebrush and Ephedra, at an elevation of 7,500 feet. Slope is 25 percent. When described (4/28/80), the soil was slightly moist from 4 to 7 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 4 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; single grain; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; 40 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

B2t – 4 to 7 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular block structure; slightly hard, very friable, sticky and slightly plastic; common fine and very fine roots; few fine tubular pores; common thin clay films on ped faces; 20 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B3t – 7 to 10 inches; brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few fine roots; common very fine and fine interstitial pores; common moderately thick clay films bridging mineral grains; 30 percent gravel; moderately alkaline (pH 8.0); clear irregular boundary.

Cr – 10 inches; degraded granodiorite.

The surface is covered with 15 percent cobbles and 10 percent stones.

Type Location: About 370 feet west and 1,950 feet north of the southeast corner of Section 34, T.11S., R.35E., MDBM, Independence NW Quadrangle.

Range in Characteristics: Depth to the paralithic contact is 10 to 18 inches. The mean annual soil temperature at the contact is 47 to 59°F. The soil moisture control section is 5 to 10 inches. It is usually dry in all parts from early April to mid October. The control section includes all of the soil profile for those pedons 14 inches deep or shallower, or the entire argillic horizon for those pedons deeper than 14 inches. It is sandy loam, fine sandy loam, sandy clay loam or clay loam with 19 to 34 percent clay by weight, and an average of 26 percent. Rock fragments are 0 to 40 percent gravel and average 20 percent gravel by volume. Reaction for the profile is mildly to moderately alkaline (pH 7.6 to 8.0).

Some pedons lack a B3t horizon or have a C1 horizon.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2, 3/3 or 4/2. It is sandy loam, fine sandy loam or loam with 9 to 17 percent clay, and 0 to 40 percent gravel by volume. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

The B2t horizon has dry color of 10YR 5/3 or 5/4, or 7.5YR 5/4; moist color is 10YR 4/3 or 4/4. It is sandy clay loam or clay loam with 25 to 34 percent clay by weight, and 0 to 20 percent gravel by volume. Reaction is mildly to moderately alkaline (pH 7.6 to 8.0).

The Cr horizon is degraded granodiorite, highly weathered granite or highly weathered adamellite.

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Table 7. -- Key for Soil Identification

Soils of the Alluvial Plains -- Moderate and Cool Soil Temperatures (MESIC and FRIGID)	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class										Drainage Class		
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epipedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive	
										Mollic	Pachic	Ochric	None	Cambic	Argillic													
SOIL NAME																												
Berent family			x						x			x	x				x							x				
Bluewing family			x						x			x	x			x									x			
Durargidic Argixerolls		x							x	x					x				x					x				
Gol family		x					x					x			x			x						x				
Mackey family			x						x			x		x			x							x				
Preston family			x						x			x	x				x									x		
Spanel family			x						x			x			x			x						x				
Trocken family			x					x	x			x	x			x								x				
Typic Xerorthents			x						x			x	x					x						x				
Unionville family			x					x	x			x		x				x						x				
Wrango family			x						x			x	x			x								x				

Table 7. -- Key for Soil Identification (Continued)

	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class										Drainage Class		
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Mollic	Pachic	Ochric	None	Cambic	Argillic	Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive	
Soils of the Temperate Uplands -- Moderate and Cool Soil Temperatures (MESIC, FRIGID and CRYIC)																												
SOIL NAME																												
Abgese family		x				x			x			x			x						x					x		
Bearskin family					x	x	x			x					x				x							x		
Berning family						x		x				x			x							x				x		
Beveridge family	x						x					x	x				x									x		
Credo family						x		x	x			x			x						x					x		
Hymas family	x						x			x			x				x									x		
Lithic Camborthids					x		x					x		x			x									x		
Merlin family						x	x			x					x									x		x		
Risue family						x	x					x			x									x		x		
Sanpete family	x							x				x		x			x									x		
Simpson family						x		x		x					x										x	x		
St. Marys family						x			x	x				x			x									x		
Swift Creek family	x							x				x	x				x									x		
Theriot family	x						x					x	x				x									x		
Toeja family						x		x		x					x						x					x		
Tweedy family						x		x		x					x						x					x		
Wenzel family				x				x		x					x							x				x		

Table 7. -- Key for Soil Identification (Continued)

	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class										Drainage Class		
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epipedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive	
										Mollic	Pachic	Ochric	None	Cambic	Argillic													
Plutonic and Noncarbonate Sedimentary and Metamorphic Rock Soil Parent Materials																												
SOIL NAME																												
Basket family				x				x	x			x			x									x				
Blackston family			x						x			x	x			x								x				
Bondbranch family				x			x					x		x				x						x				
Brad family		x					x				x			x												x		
Bregar family				x			x					x			x									x				
Cath family			x						x			x			x					x				x				
Checkett family					x		x					x			x									x				
Dunul family		x							x			x	x			x								x				
Finley family				x				x				x		x										x				
Hartig family		x						x	x		x			x										x				
Mascamp family					x		x				x				x									x				
Mexispring family		x					x					x	x											x				
Midas family			x						x			x		x										x				
Moano family				x			x					x	x					x						x				
Mulett family				x			x					x		x										x				
Packham family			x					x	x			x		x										x				
Slinger family		x		x				x	x			x												x				
Spaa family						x	x				x			x				x						x				
Sumine family				x				x	x		x					x								x				
Typic Haplargids						x		x	x			x											x	x				
Vipont family						x			x				x											x				
Washoe family				x		x		x	x			x												x				
Yuko family		x					x					x						x						x				

Table 7. -- Key for Soil Identification (Continued)

	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class										Drainage Class		
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epipedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive	
										Mollic	Pachic	Ochric	None	Cambic	Argillic													
Soils of the Cold Uplands -- Cold Soil Temperatures (Cryic and Pergelic)																												
SOIL NAME																												
Bartine family	x								x		x				x				x						x			
Pergelic Cryoborolls		x						x	x		x				x				x						x			
Soakpak family		x						x	x				x		x				x						x			
Supervisor family				x				x	x		x			x					x						x			

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Glossary

Adamellite. A phaneritic rock containing major plagioclase, orthoclase and quartz, with minor amounts of biotite and hornblende.

Alkaline Soil. Any soil having a pH higher than 7.0.
See **Reaction, soil**.

Alluvial depressions. Low-lying areas subject to alluvial deposition. These include playas, basins, stream valleys, washes and other drainages.

Alluvial fan. A sloping, fan-shaped mass of sediment deposited by a stream where it emerges from an upland onto a plain.

Alluvial terrace. An old alluvial plain, ordinarily flat or undulating, bordering a river, lake or sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Alluvium. Material, such as sand, silt, or clay, deposited on land by water action.

Andesite. A volcanic rock composed essentially of andesine and one or more mafic constituents.

Argillic horizon. See **Diagnostic horizons**.

Aspect. The direction a slope is facing; its exposure in relation to the sun.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Ballena. A ridgecrest (literally, a whale).

Basalt. An extrusive rock composed primarily of calcic plagioclase and pyroxene, with or without olivine.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K) expressed as a percentage of the total cation exchange capacity.

Bedrock. Solid rock that underlies the soil and other unconsolidated material or that is exposed at the

surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly occurring with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Calcic horizon. See **Diagnostic horizons**.

Cambic horizon. See **Diagnostic horizons**.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels.
Synonyms: Clay coating, clay skin.

Claypan. A dense, compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by the downward movement of clay or by synthesis of clay in place during soil formation. Claypans mainly are hard when dry and plastic and sticky when wet. They generally impede the movement of water and air and the growth of plant roots.

Cobble. A fragment of rock 3 to 10 inches (7.62 to 25.40 cm) in diameter.

Colluvial slope. An inclined surface usually at the base of mountainsides formed by material transported and deposited by mass wasting (direct gravitational action) and local unconcentrated runoff.

Colluvium. A deposit of soil material, rock fragments, or both, accumulated on steep slopes or at the base of steep slopes primarily by the action of gravity but facilitated by the overland flow of water.

Color. See **Munsell notation**.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate geographical pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented. Hard; little affected by moistening.

Consociation, soil. A map unit in which only one kind of soil or miscellaneous area dominates.

Control Section. That part of a soil profile containing the horizons that determine the placement of the soil in the new system of soil classification. Generally, these horizons are between a depth of 10 inches and 40 inches.

Cryic soil temperature regime. A soil temperature regime where mean annual soil temperature is higher than 32° F. (0°C), but lower than 47° F. (8°C) and the mean summer soil temperature is less than 59° F. (15°C), at a depth of 20 inches or at a lithic or paralithic contact, whichever is shallower.

Depth Class. The distance from the surface of the soil to underlying bedrock, consolidated substra-

tum, or other material that would greatly restrict either root distribution or soil moisture and nutrient supply.

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Diagnostic horizons. As used in the soil classification system of the National Cooperative Soil Survey in the United States, combinations of specific characteristics that indicate certain classes of soils. Those that occur at the soil's surface are called epipedons. Those below the surface are called diagnostic subsurface horizons:

Argillic horizon. A subsurface horizon into which clay has moved. It has more than 1.2 times the amount of clay that the horizons above it have. The presence of clay films on ped surfaces and in soil pores is evidence of clay movement.

Calcic horizon. A horizon of accumulation of calcium carbonate or of calcium carbonate and magnesium carbonate, usually in the C horizon, but may also be in other horizons such as a mollic epipedon, an argillic or a natric horizon, or a duripan.

Cambic horizon. A subsurface horizon that is finer than loamy fine sand in texture and in which materials have been altered or removed, but have not accumulated. Elimination of fine stratification; changes caused by wetness, such as gray color and mottling; redistribution of carbonates; and yellow or redder color than in underlying horizons are evidence of alteration.

Mollic epipedon. A dark-colored surface horizon, generally more than 7 inches thick. It contains more than 1 percent organic matter and has more than 50 percent base saturation. It is not both hard and massive when dry. Color is darker than 3.5 in value when moist and 5.5 in value when dry, and is less than 3.5 in chroma when moist.

Ochric epipedon. A surface horizon that is too light in color (higher in value or chroma than a mollic epipedon), too low in organic matter or too thin to be a mollic or umbric epipedon.

Pachic epipedon. A dark-colored surface horizon, similar to the Mollic epipedon, but thicker than 20 inches.

Dolomite. A mineral, $\text{CaMg}(\text{CO}_3)_2$, commonly with some Fe replacing the Mg.

Drainages, modern. A drainage whose capacity to transport a load is greater than the load it is called upon to carry. These drainages usually have a steep gradient and therefore swift water movement. (Contrast with a mature drainage, whose capacity to transport a load is equal to the load it is called upon to carry.)

Drainages, recent. See **Drainages, modern.**

Durinodes. Silica-cemented soil aggregates.

Duripan. A subsurface horizon that is cemented by silica to the point that fragments from the air-dry horizon will not slake after prolonged soaking in water or hydrochloric acid.

Effervescence. The reaction of soil carbonates to 1 Normal hydrochloric acid. The classes of effervescence are slightly, strongly and violently effervescent. Soils with slight effervescence form readily observable gas bubbles; soils with strong effervescence form a low gas foam; and soils with violent effervescence form a thick gas foam, which "jumps" up.

Eolian. Soil material accumulated through wind action.

Epipedon. A horizon at the soil surface which has been either appreciably darkened by organic matter or eluviated, or, as a minimum, the rock structure has been destroyed. Also see **Diagnostic horizons**.

Erosion. The wearing away of the land surface by running water, waves, moving ice, wind, or other geologic processes, such as mass wasting or gravitational creep. Also, the detachment and movement of soil or rock. Geologic erosion refers to natural processes occurring over long periods of time. Accelerated erosion is erosion much more rapid than natural geologic erosion, primarily as a result of the influence of the activities of man or, in some cases, of animals.

Family, soil. A grouping of soils within a subgroup having similar physical and chemical properties that affect their responses to management and manipulation for use.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet and fringes a mountain range or high-plateau escarpment.

Frigid Soil Temperature regime. A soil temperature regime that has a mean annual soil temperature lower than 47°F (8°C) and the difference between mean winter and mean summer soil temperature is more than 9° F. (5°C) at a depth of 20 inches (50 centimeters) or at a lithic or paralithic contact, whichever is shallower.

Glacial moraine. See **Moraine**.

Granitic rock. Light-colored, coarse-grained rock formed by solidification from a molten or partially molten state.

Granodiorite. A plutonic rock consisting of quartz, calcic oligoclase or andesite, and orthoclase with biotite, hornblende or pyroxene.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 mm. to 7.5 cm.) in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. It is larger than 4 inches (10 centimeters) deep and 6 inches (15 centimeters) wide.

Hard bedrock. See **Lithic Contact**.

Hardpan. Synonymous with **Duripan**.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soils are as follows:

O horizon. An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon. The mineral horizon forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material.

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused by (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) by a combination of these.

C horizon. The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizons. The material of a C horizon may be either like or unlike that in which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Igneous rock. Rock that formed from the cooling and solidification of magma and that has not been changed appreciably since its formation.

Inclusions. Soils occurring in the map unit that are not identified by their names because the area they occupy is too small.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is a movement of water through soil layers or material.

Lava flow. See **Volcanic flow**.

Limestone. A bedded sedimentary deposit consisting chiefly of calcium carbonate.

Lithic contact. The boundary between soil and continuous, coherent, underlying material (hard rock), which is hard enough to prohibit digging with hand tools and if fractured, the pieces are not displaced relative to each other.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Marble. A metamorphic rock composed essentially of calcite and/or dolomite.

Mesic soil temperature regime. A soil temperature regime in which the mean annual soil temperature is 47°F. (8°C) or higher but lower than 59° F. (15°C), and the difference between mean summer and mean winter soil temperature is more than 9° F. (5°C) at a depth of 20 inches (50 centimeters) or at a lithic or paralithic contact, whichever is shallower.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition or structure by heat, pressure and movement. Nearly all such rocks are crystalline.

Metasedimentary rock. Sedimentary rock altered in mineralogical composition, chemical composition or structure by heat, pressure and movement.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of an organic soil.

Miscellaneous area. An area that has little or no natural soil material capable of supporting vegetation (for example, Rock outcrop).

Modern Drainage. A drainage whose capacity to transport a load is greater than the load it is called upon to carry. These drainages usually have a steep gradient and therefore swift water movement. (Contrast with a mature drainage, whose capacity to transport a load is equal to the load it is called upon to carry).

Mollic epipedon. See **Diagnostic horizons**.

Moraine. An accumulation of earth, stones and other debris by a glacier. Some types are terminal, lateral, medial and ground.

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (related to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Munsell notation. A designation of color by degrees of the three single variables; hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant that is essential to its growth. Plant nutrients are mainly nitrogen, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron and zinc obtained from the soil; and carbon, hydrogen and oxygen obtained from the air and water.

Ochric epipedon. See **Diagnostic horizons**.

Older alluvial fan. An alluvial fan that is a remnant of old landslides or debris flows.

Organic layer. A layer of fresh and decaying plant residue at the surface of a mineral soil.

Organic matter, soil. The organic fraction of the soil including plant and animal residues at various

stages of decomposition, cells and tissues of soil organisms, and substances synthesized by organisms living in the soil. Soil organic matter commonly is determined by measuring the amount of organic material in a soil sample passed through a 2-millimeter sieve.

Pachic epipedon. See **Diagnostic horizons**.

Paralithic contact. A boundary between soil and continuous coherent underlying material. If the underlying material is a single mineral, it has a hardness by Moh's scale of less than 3. If it is not a single mineral, chunks of gravel size that can be broken out will disperse more or less completely during 15 hours of end-over-end shaking in water or in sodium hexametaphosphate solution and, when moist, the material can be dug with difficulty with a spade. There may be cracks in the rock, but the horizontal spacing between cracks should be 10 cm or more.

Parent material. The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes.

Particle-size class. The grain-size distribution of the whole soil. It is not the same as texture, which refers to the fine-earth fraction (material 2 mm and smaller). The following are those recognized in this survey area:

Sandy-skeletal. Rock fragments 2 mm in diameter or larger make up 35 percent or more of the soil by volume, there is enough fine earth to fill the interstices larger than 1 mm, and the fraction finer than 2 mm is sandy, as defined for the sandy particle-size class.

Loamy-skeletal. Rock fragments make up 35 percent or more of the soil by volume, there is enough fine earth to fill interstices larger than 1 millimeter, and the fraction finer than 2 millimeters is loamy, as defined for the loamy particle-size class.

Clayey-skeletal. Rock fragments make up 35 percent or more of the soil by volume, there is enough fine earth to fill interstices larger than 1 millimeter and the fraction finer than 2 millimeters is clayey, as defined for the clayey particle-size class.

Sandy. The texture of the fine earth is a sand or loamy sand that is coarser than very fine sand or loamy very fine sand respectively, and rock fragments make up less than 35 percent by volume.

Loamy. The texture of the fine earth is loamy very fine sand, very fine sand or finer, but the amount of clay is less than 35 percent, and the rock fragments are less than 35 percent by volume.

Coarse-loamy. By weight, 15 percent or more of the particles are fine sand (0.25 to 0.1 millimeter in diameter) or coarser, including fragments up to 7.5 centimeters in diameter; and there is less than 18 percent clay in the fine-earth fraction.

Fine-loamy. By weight, 15 percent or more of the particles are fine sand (0.25 to 0.1 millimeters in diameter) or coarser, including fragments up to 7.5 centimeters in diameter; and there is 18 through 34 percent clay in the fine-earth fraction.

Clayey. The fine earth contains 35 percent or more clay by weight, and the rock fragments are less than 35 percent by volume.

Fine. A clayey particle-size class that has 35 through 59 percent clay in the fine-earth fraction.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit the study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pergelic soil temperature regime. A soil temperature regime in which the mean annual soil temperature is lower than 32°F (0°C), at a depth of 20 inches (50 centimeters), or at a lithic or paralithic contact, whichever is shallower.

pH value. A numerical designation of acidity and alkalinity in soil. See **Reaction, soil**.

Plutonic rock. An igneous rock formed at great depth by magmatic crystallization or chemical alteration.

Precipitation, mean annual. The average precipitation received annually by an area. It includes both rainfall and snow.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Pyroclastic rock. Any rock consisting of unworked solid material of whatever size, explosively or aerically ejected from a volcanic vent.

Quartz monzonite. Synonymous with Adamellite.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity (pH) is expressed as:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recent Drainage. See **Modern Drainage.**

Residuum or residual soil material. Unconsolidated, weathered or partly weathered mineral materials accumulated by disintegration of consolidated rock in place.

Rhyolite. The aphanitic (fine rock texture) equivalent of granite.

Rhyolitic tuff. A rock formed from compacted rhyolite fragments, generally less than 4 millimeters in diameter.

Ridge. A long, narrow elevation of the land surface, usually sharp crested with steep sides.

Riverwash. Barren alluvial land, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water. A miscellaneous land type.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters (0.078 inches) or more; in order of increasing size, gravel (pebbles), cobbles, stones, and boulders.

Rubbleland. An area with 90 percent or more surface cover of stones and boulders.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in

diameter. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. A cemented or otherwise compacted detrital sediment composed predominantly of quartz grains.

Sediment. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or ice, and has come to rest on the earth's surface.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Shale. A sedimentary rock formed by induration of a clay or silty clay deposit and having the tendency to split into thin layers.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. A very fine-grained consolidated clastic rock composed predominantly of particles of the silt grade.

Slate. A fine-grained metamorphic rock possessing a well-developed fissility (slaty cleavage).

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soft bedrock. See **Paralithic contact.**

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil Depth Class. The depth classes used in this survey area are:

Shallow. Less than 20 inches to a lithic or paralithic contact, or a duripan.

Moderately deep. 20 to 40 inches to the contact.

Deep. 40 to 60 inches to the contact.

Very deep. Greater than 60 inches to the contact.

Soil formation factors. The variables - parent material, climate, organisms, topography, and time-active in and responsible for the formation of soil.

Soil pores. That part of the bulk volume of soil not occupied by soil particles; the interstices or voids.

Soil Separates. The individual size-groups of mineral particles. See **Clay, Silt, and Sand**.

Soil survey. The systematic examination, description, classification, and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of field examination.

Soil Temperature regimes are based on mean annual soil temperature and the difference between mean summer and mean winter temperature. Soil temperature is determined at a depth of 20 inches (50 cm) or at a lithic or paralithic contact, whichever is shallower. Unless indicated in a higher category, soil temperature classes are used at the family level. See **Mesic, Frigid, Cryic and Pergelic soil temperature regimes**.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soils consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. The soil structure grades are structureless, weak, moderate, and strong. Structureless soils are either single grained (noncoherent) or massive (coherent).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "A horizon."

Temperature, mean annual. The average air temperature of an area on a yearly basis.

Temperature, mean annual soil. The average soil temperature at a depth of 20 inches (50 centimeters), on a yearly basis.

Temperature, mean summer soil. The average soil temperature at a depth of 20 inches (50 centimeters), for the months of June, July and August.

Temperature, mean winter soil. The average soil temperature at a depth of 20 inches (50 centimeters), for the months of December, January and February.

Temperature regimes, soil. See **Thermic, Mesic, Frigid, Cryic and Pergelic soil temperature regimes**.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." See **Clay, Silt and Sand**.

Texture modifier. Adjective included in a soil textural class name, based on the percentage of rock fragments in the soil. Examples:

Gravelly	15 to 35 percent
Very gravelly	35 to 60 percent
Extremely gravelly	over 60 percent

Toeslope. The geomorphic component that forms the outermost, gently-inclined surface at the base of a mountainside.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Upland basin. A nearly level to gently sloping depressed area in mountains with limited or no surface outlet.

Volcanic flow. A mass of deep-seated igneous material extruded onto the earth's surface typically forming a gently to moderately sloping, relatively flat incline.

Volcanic rock. The class of igneous rocks that have

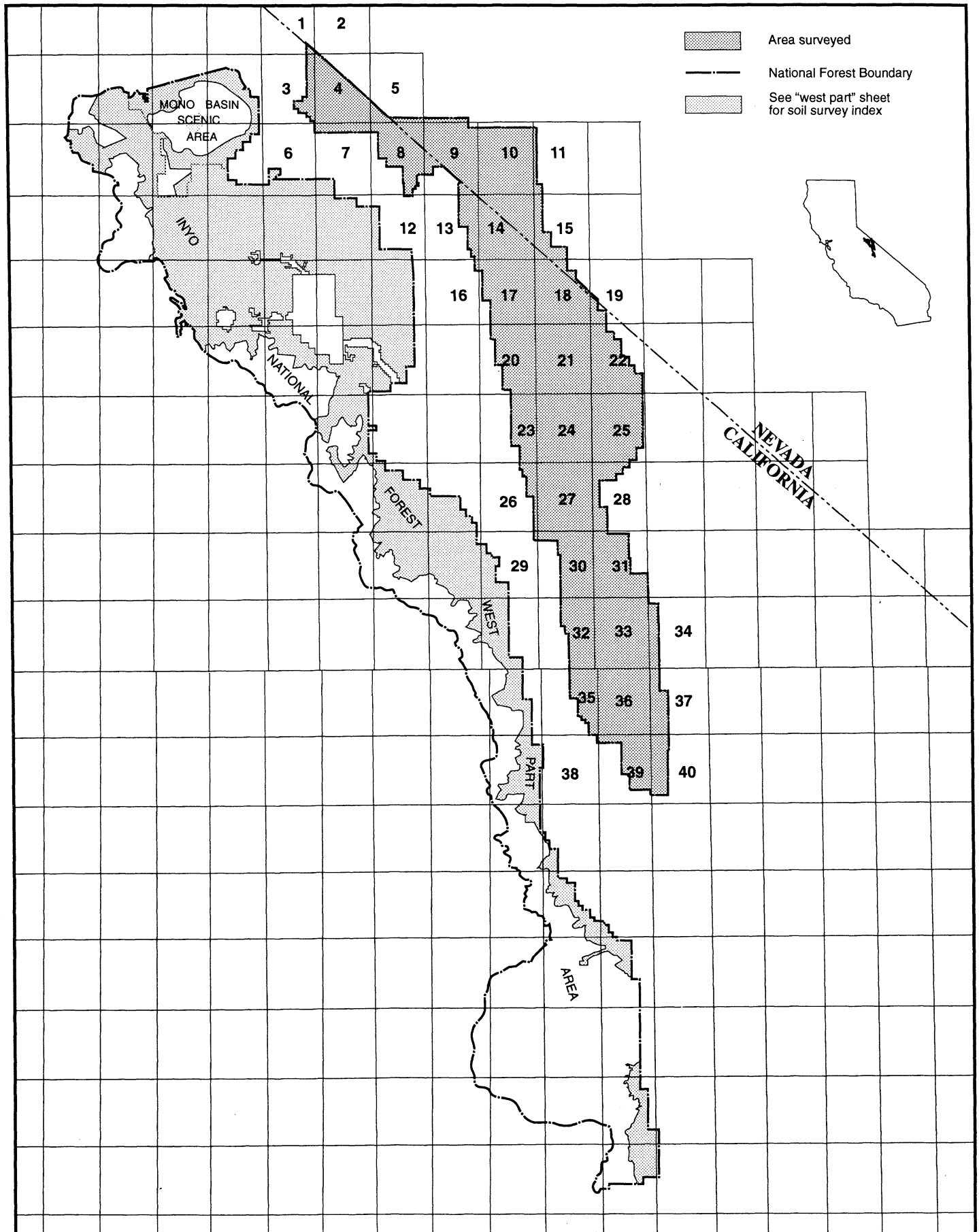
been poured out or ejected at or near the earth's surface.

Water table. The upper surface of ground water or that level in the ground where water is at atmospheric pressure.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point. The moisture content of soil, on an oven-dry basis, at which a plant wilts so much that it does not recover when placed in a humid, dark chamber.

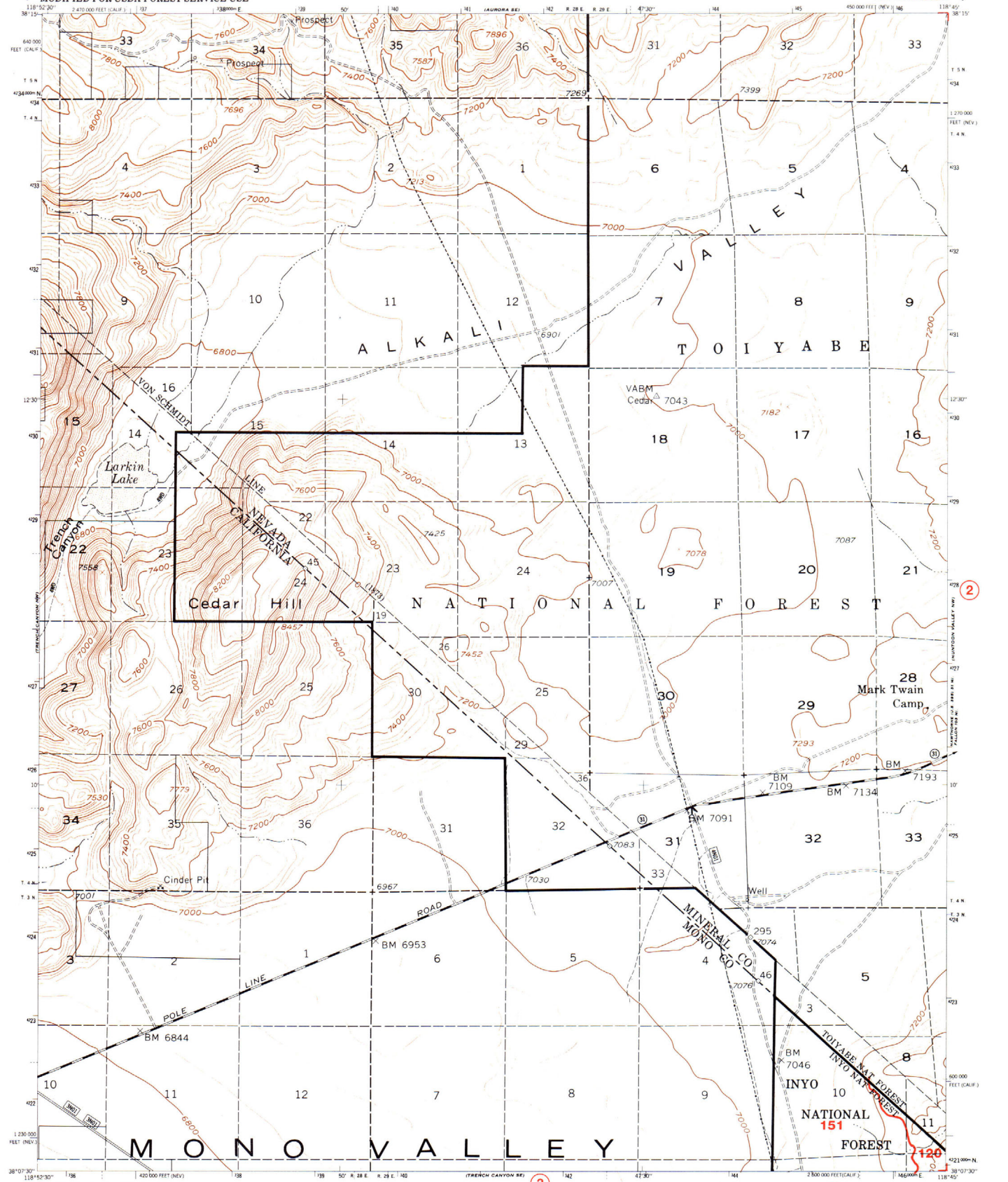
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INYO NATIONAL FOREST – EAST PART AREA
1983



INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

TRENCH CANYON NE QUADRANGLE
MT DIABLO MERIDIAN
MINERAL CO., NEVADA - MONO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
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Base map prepared by the U.S. Geological Survey
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Map dated 1958
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10,000-foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone.
1000-meter Universal Transverse Mercator grid ticks zone 11
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UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

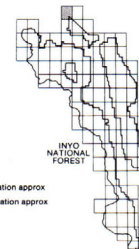
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad
Withdrawn BLM Land

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protection

Landset revised according to additional Forest Service evidence

City of Los Angeles Land

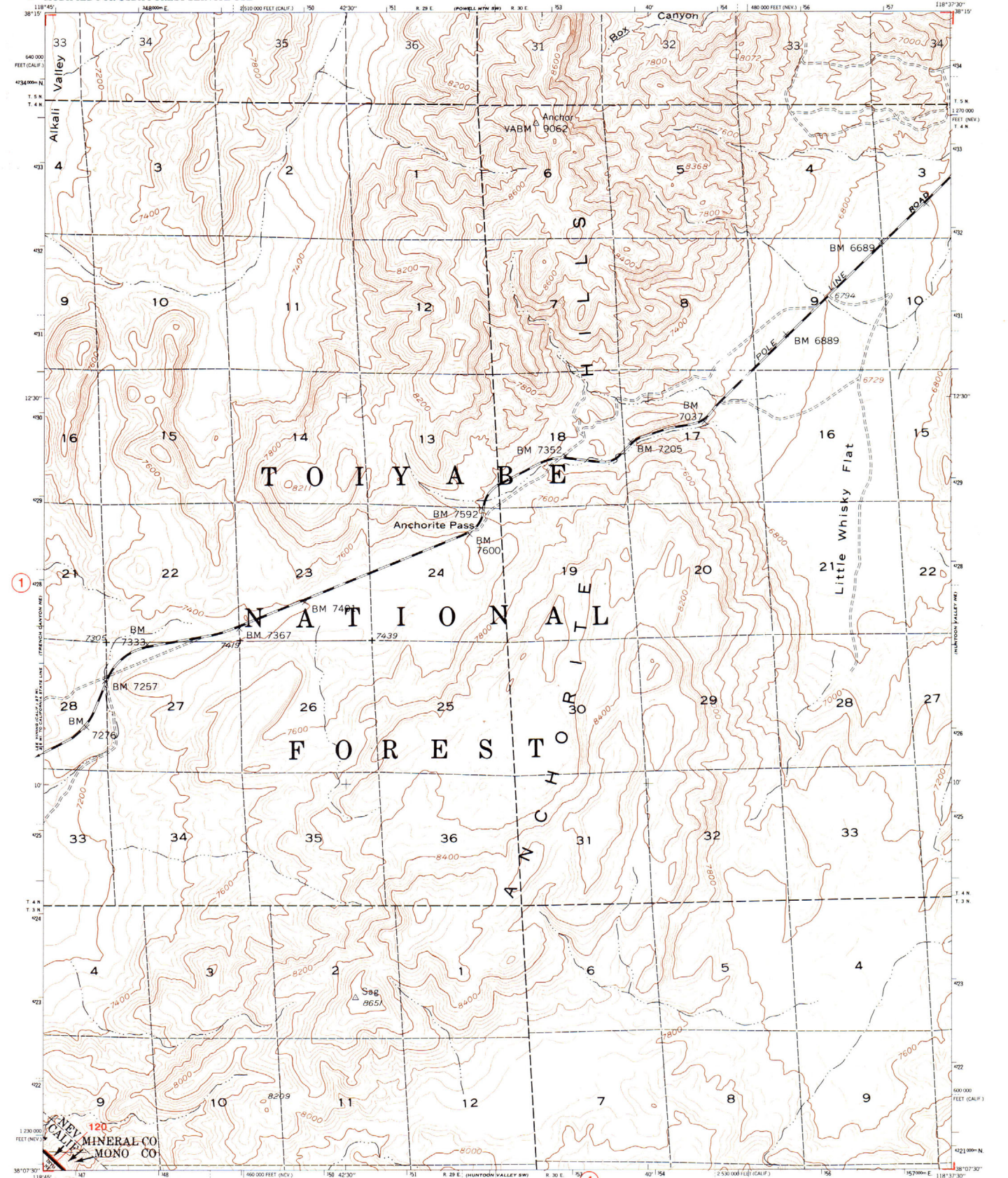


TRENCH CANYON NE, NEV - CALIF
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(469-1C)
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INYO NATIONAL FOREST AREA - EAST PART
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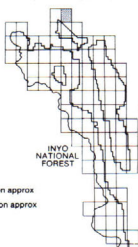
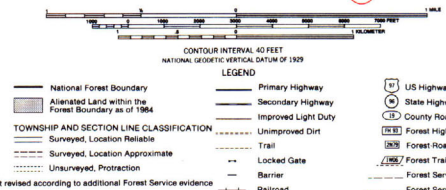
HUNTOON VALLEY NW QUADRANGLE
MINERAL CO., NEVADA-MONO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES

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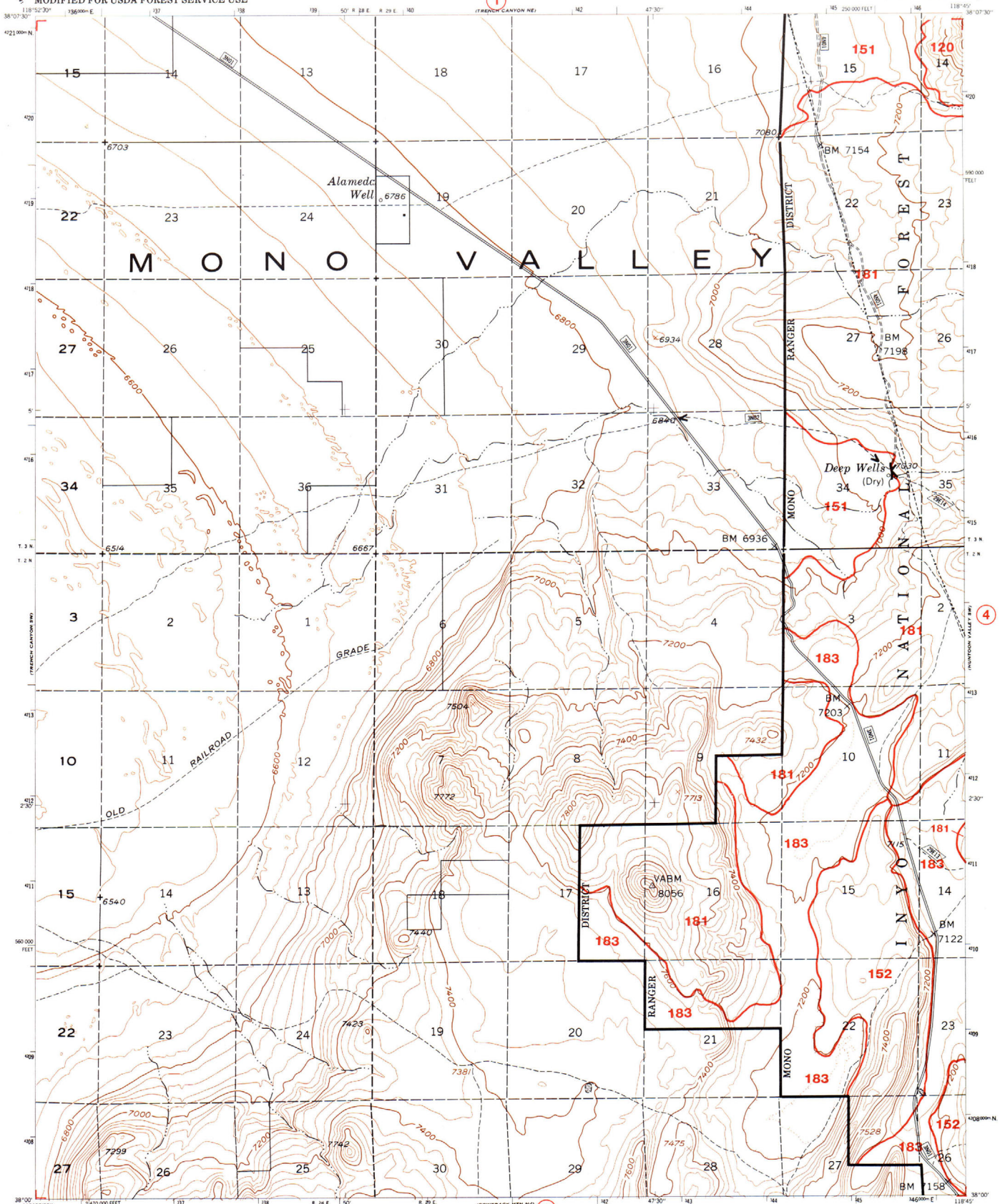


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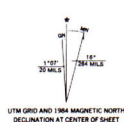
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TRENCH CANYON SE QUADRANGLE
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LEGEND

Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad
Withdrawn BLM Land

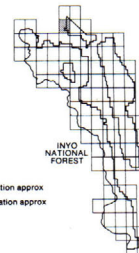
TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Landnet revised according to additional Forest Service evidence

City of Los Angeles Land

LEGEND

US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx



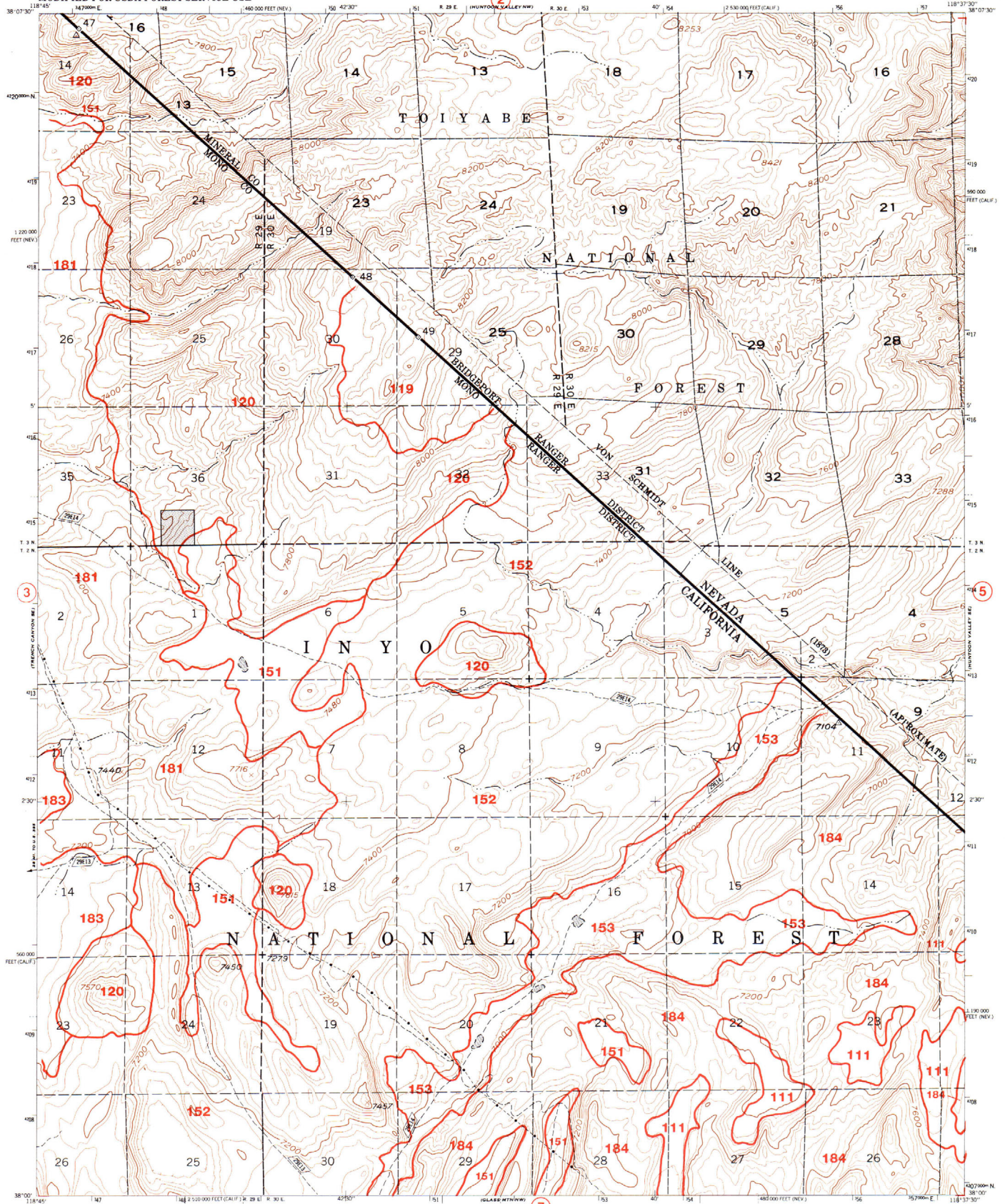
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TRENCH CANYON SE, CALIF
N8000-W18445-7.5
(469-4C)
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INYO NATIONAL FOREST AREA - EAST PART
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HUNTOON VALLEY SW QUADRANGLE
MT DIABLO MERIDIAN
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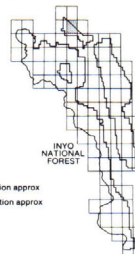


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UTM GRID AND 1984 MAGNETIC NORTH
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Legend
National Forest Boundary
Alienated Land within the
Forest Boundary as of 1984
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Surveyed, Location Approximate
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Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx

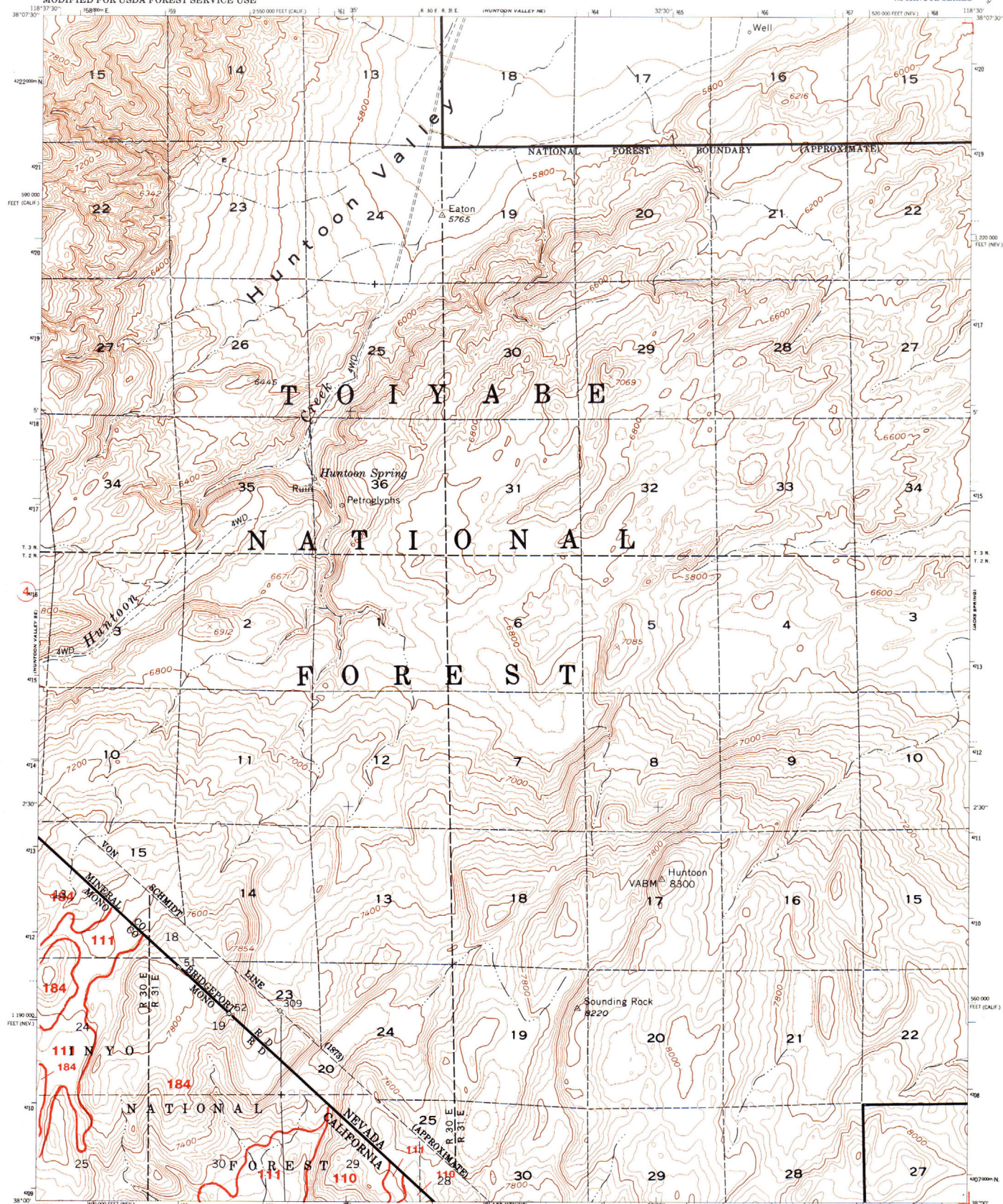


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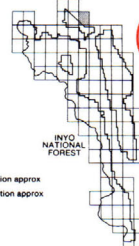
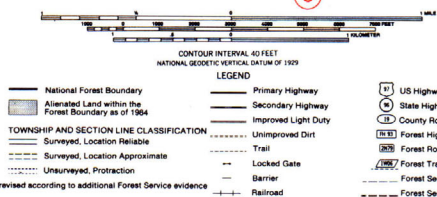
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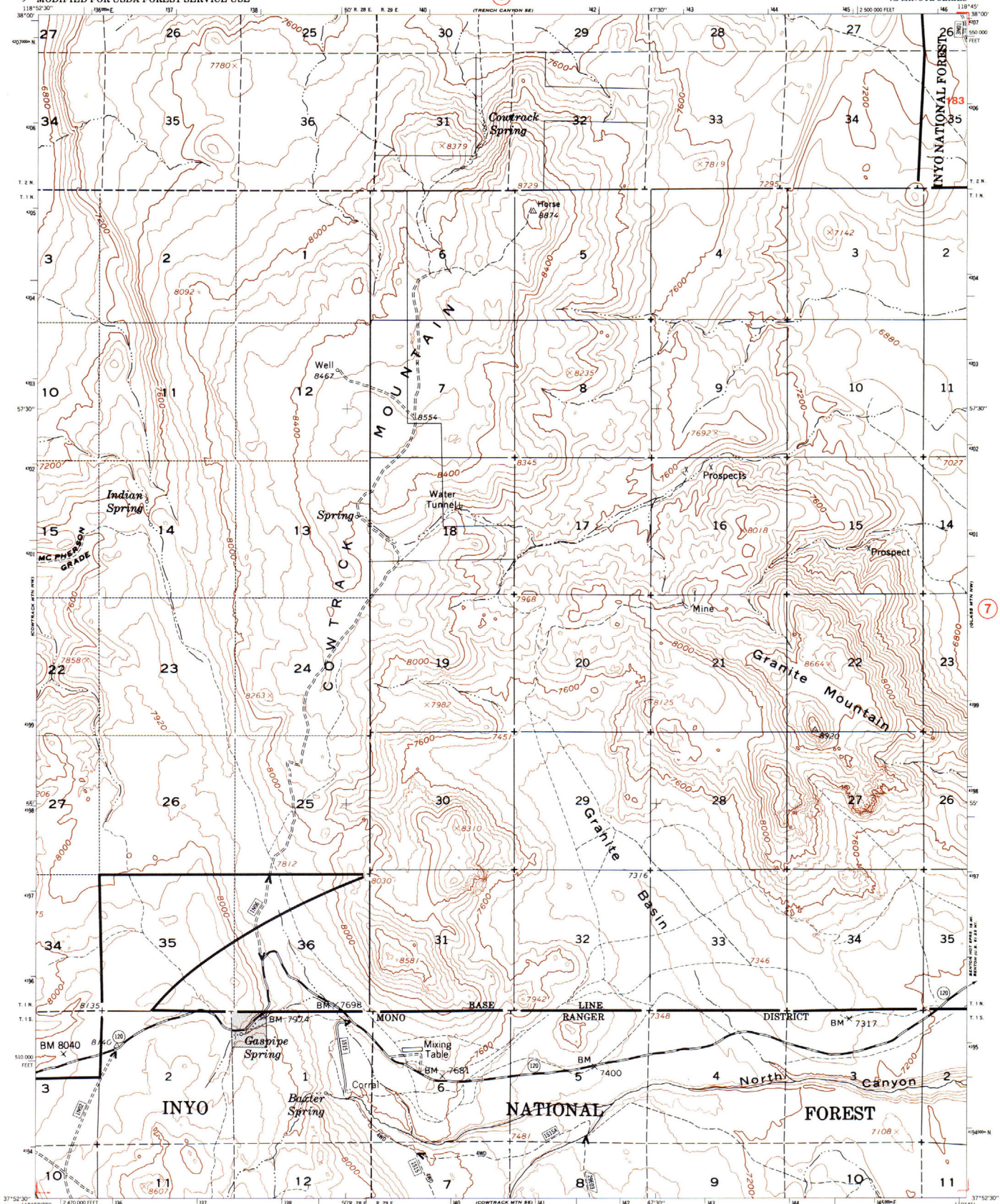


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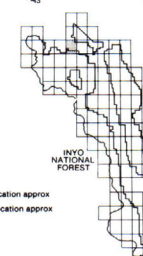
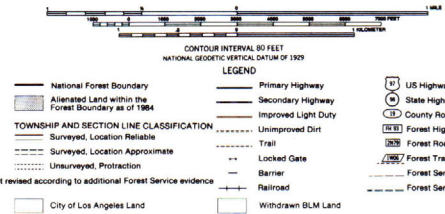
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COWTRACK MTN NE QUADRANGLE
MT DIABLO MERIDIAN
MONO CO. CALIFORNIA
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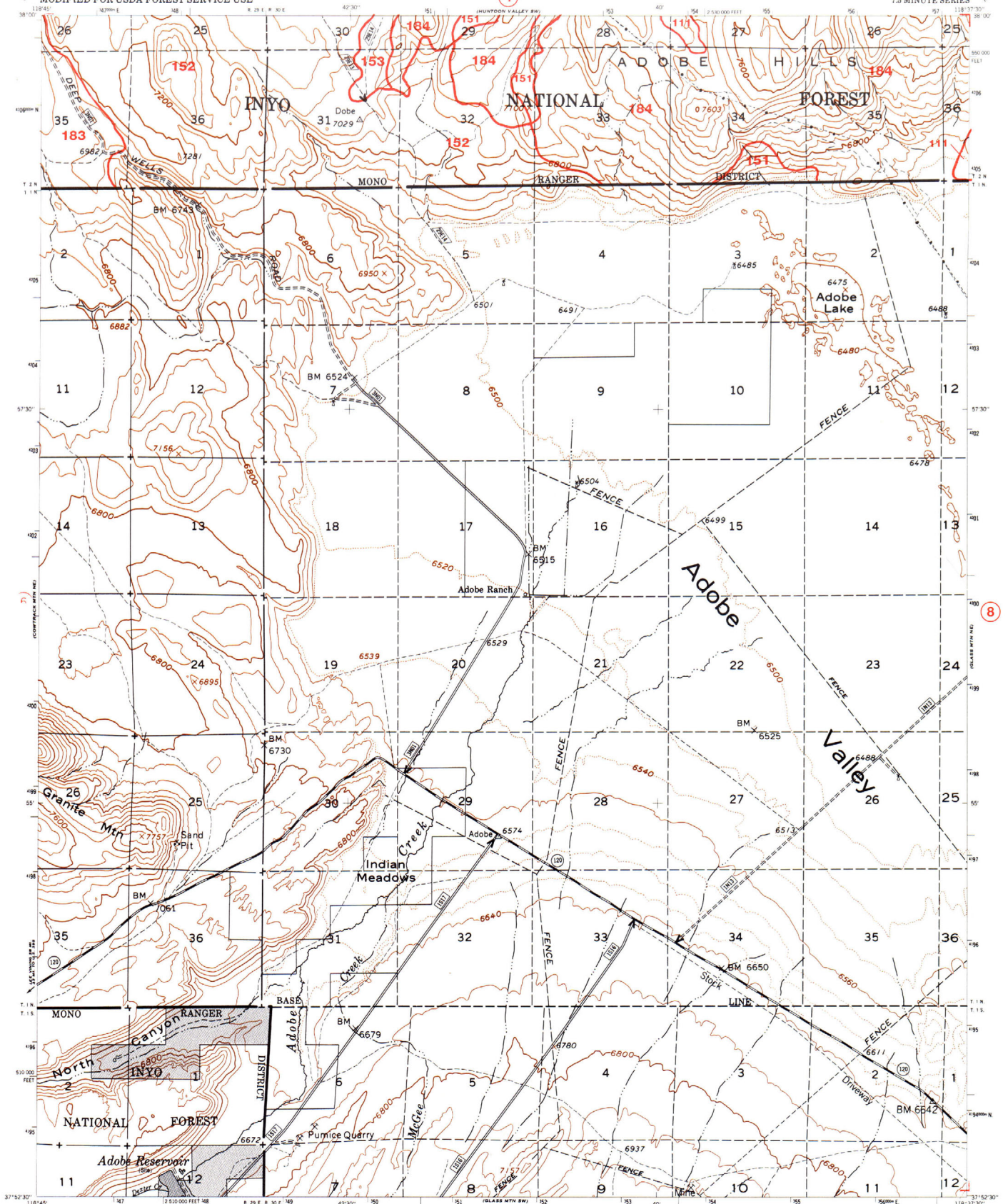
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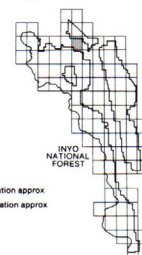
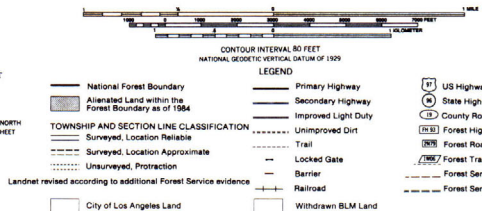
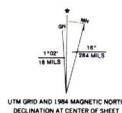
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MT DIABLO MERIDIAN
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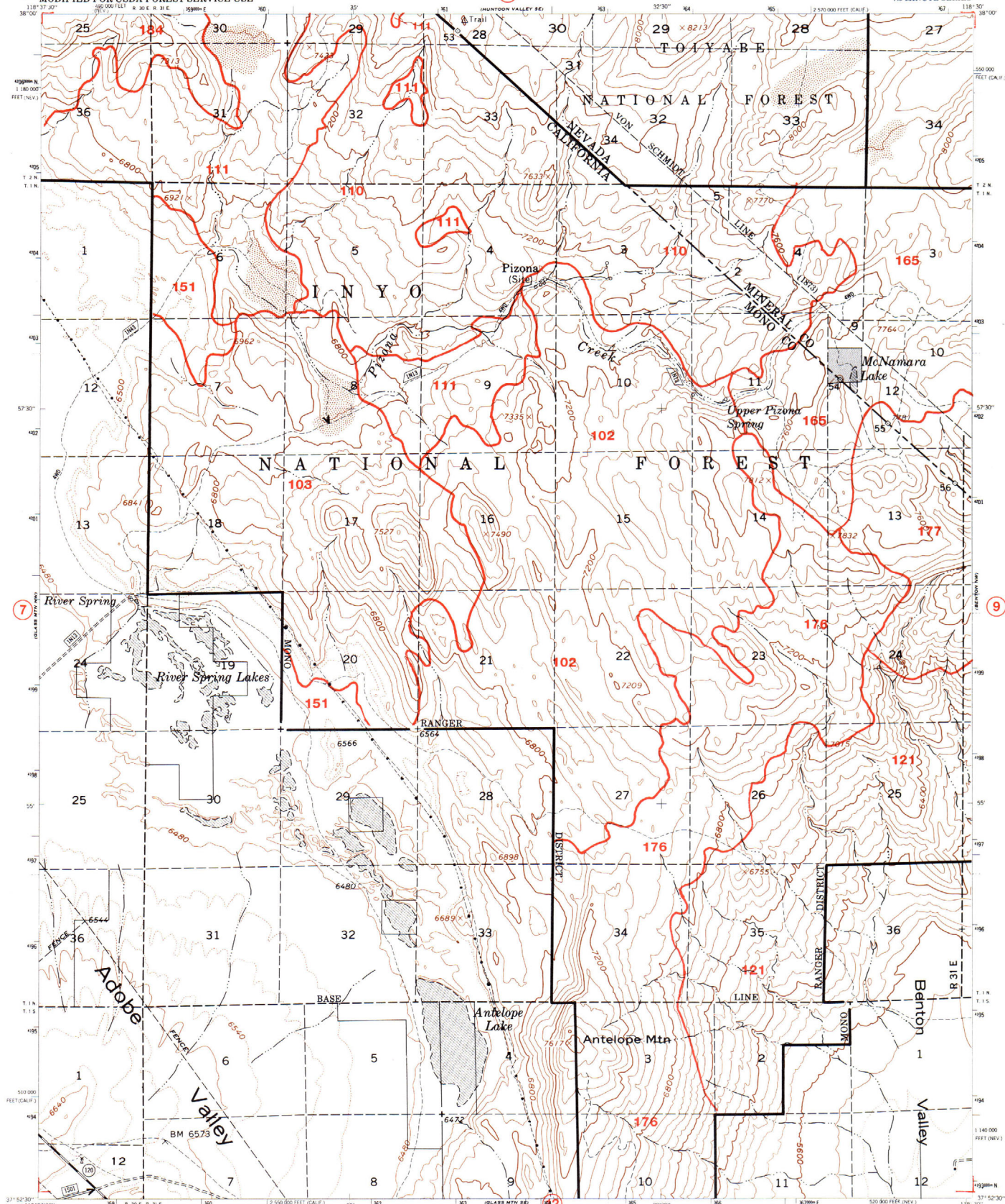
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GLASS MTN NW CALIF
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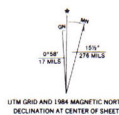
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GLASS MTN NE QUADRANGLE
MT DIABLO MERIDIAN
MINERAL CO., NEVADA MONO CO., CALIFORNIA
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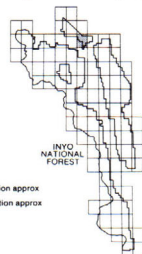
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Polyconic projection - 1927 North American datum
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LEGEND

- National Forest Boundary
- Alienated Land within the Forest Boundary as of 1984
- TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction
- Landnet revised according to additional Forest Service evidence
- City of Los Angeles Land
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- Locked Gate
- Barrier
- Railroad
- Withdrawn BLM Land

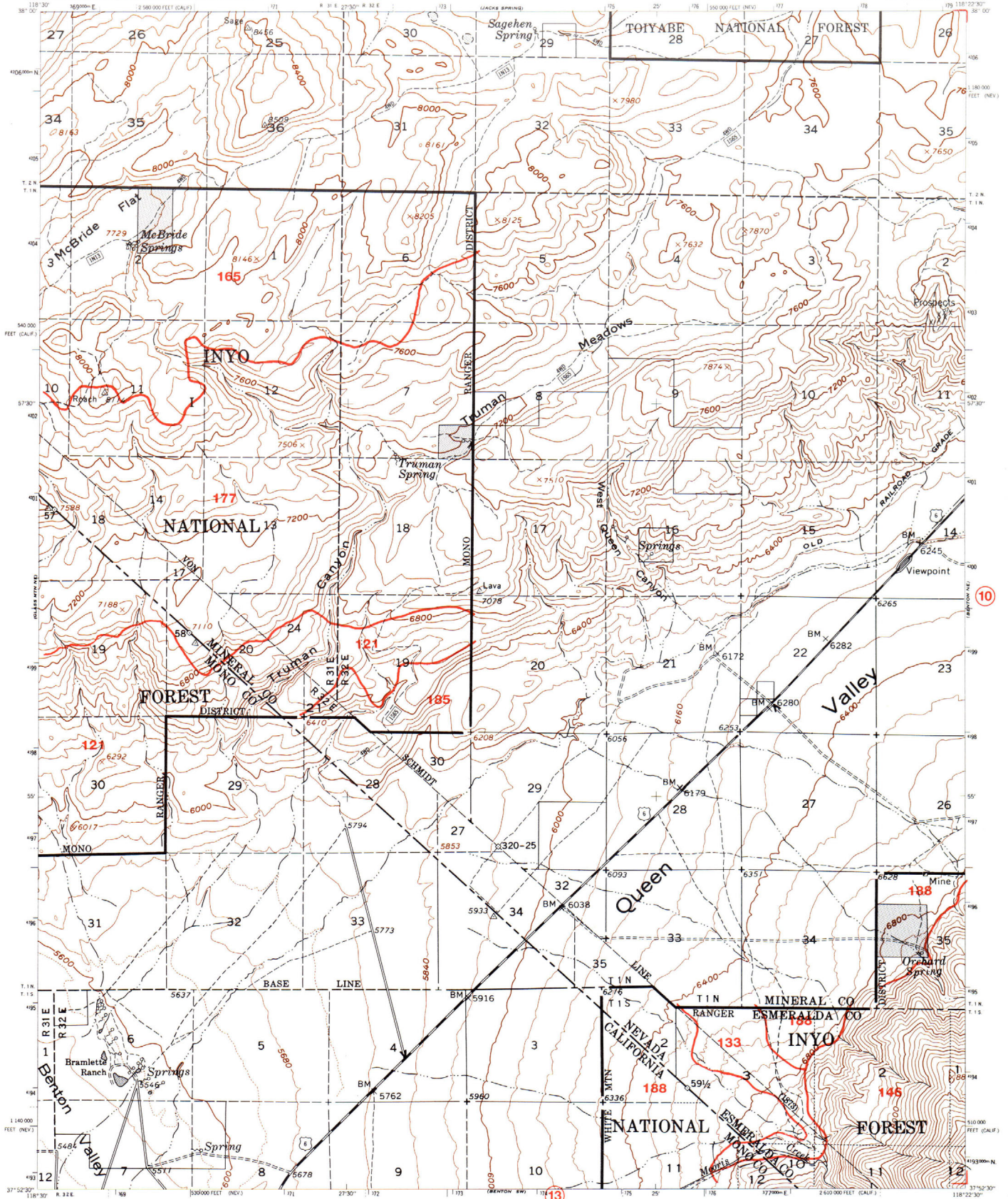


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(451-1C)
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INYO NATIONAL FOREST AREA - EAST PART
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BENTON NW QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDA-MINERAL CO., NEVADA MONO CO., CALIFORNIA
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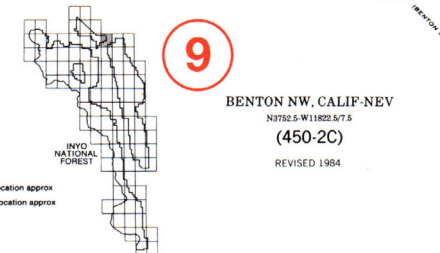
LEGEND

- Primary Highway
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- Trail
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- Withdrawn BLM Land

TOWNSHIP AND SECTION LINE CLASSIFICATION

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CONTOUR INTERVAL 80 FEET
NATIONAL GEOGRAPHIC VERTICAL DATUM OF 1929

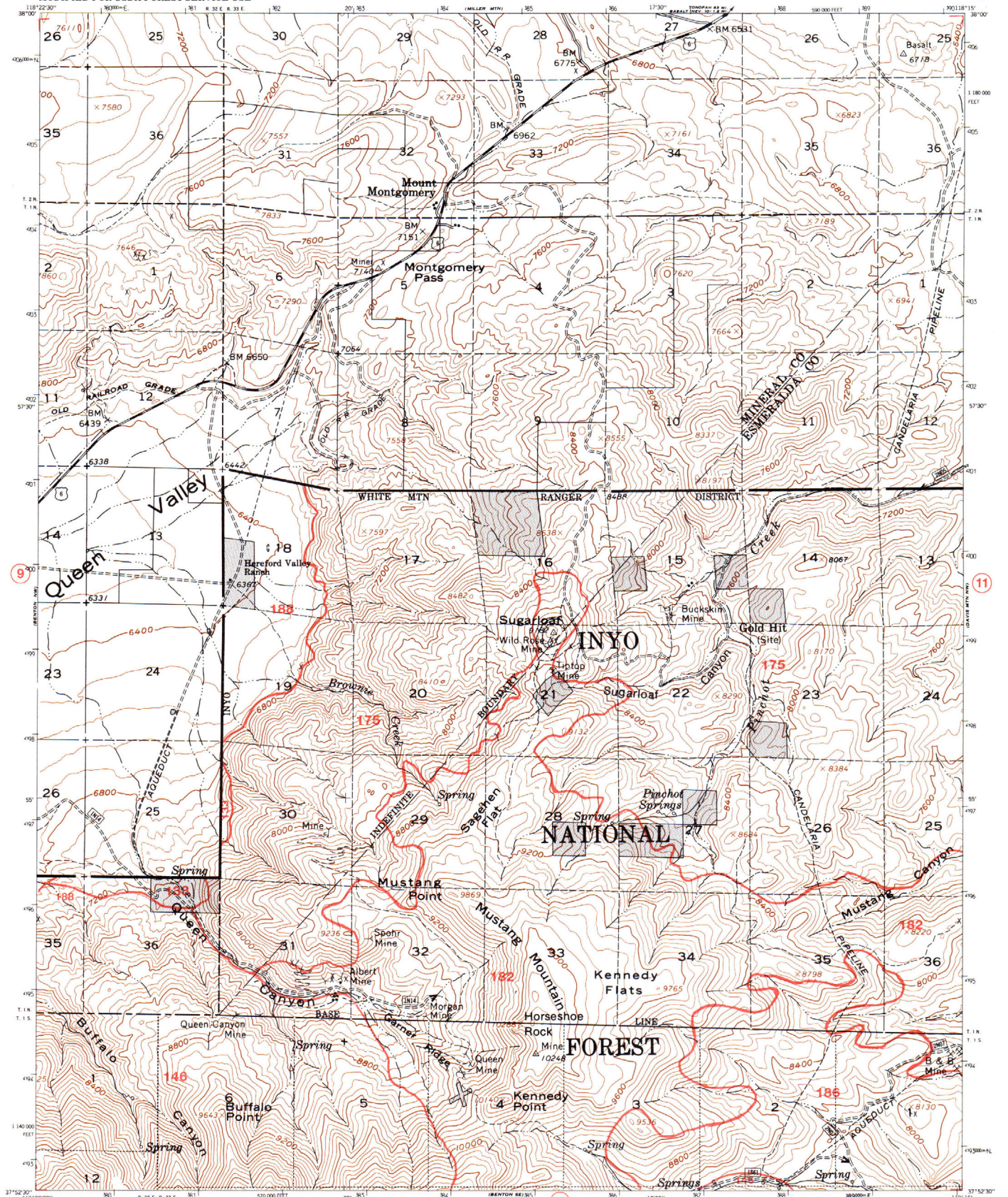


BENTON NW, CALIF-NEV
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INYO NATIONAL FOREST AREA - EAST PART
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BENTON NE QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDA-MINERAL CO. NEVADA
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UNITED STATES
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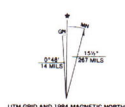


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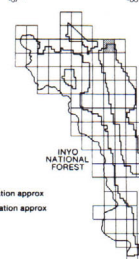
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- LEGEND**
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 - Forest Highway
 - Forest Road
 - Forest Trail
 - Forest Service Trail location approx
 - Forest Service Road location approx



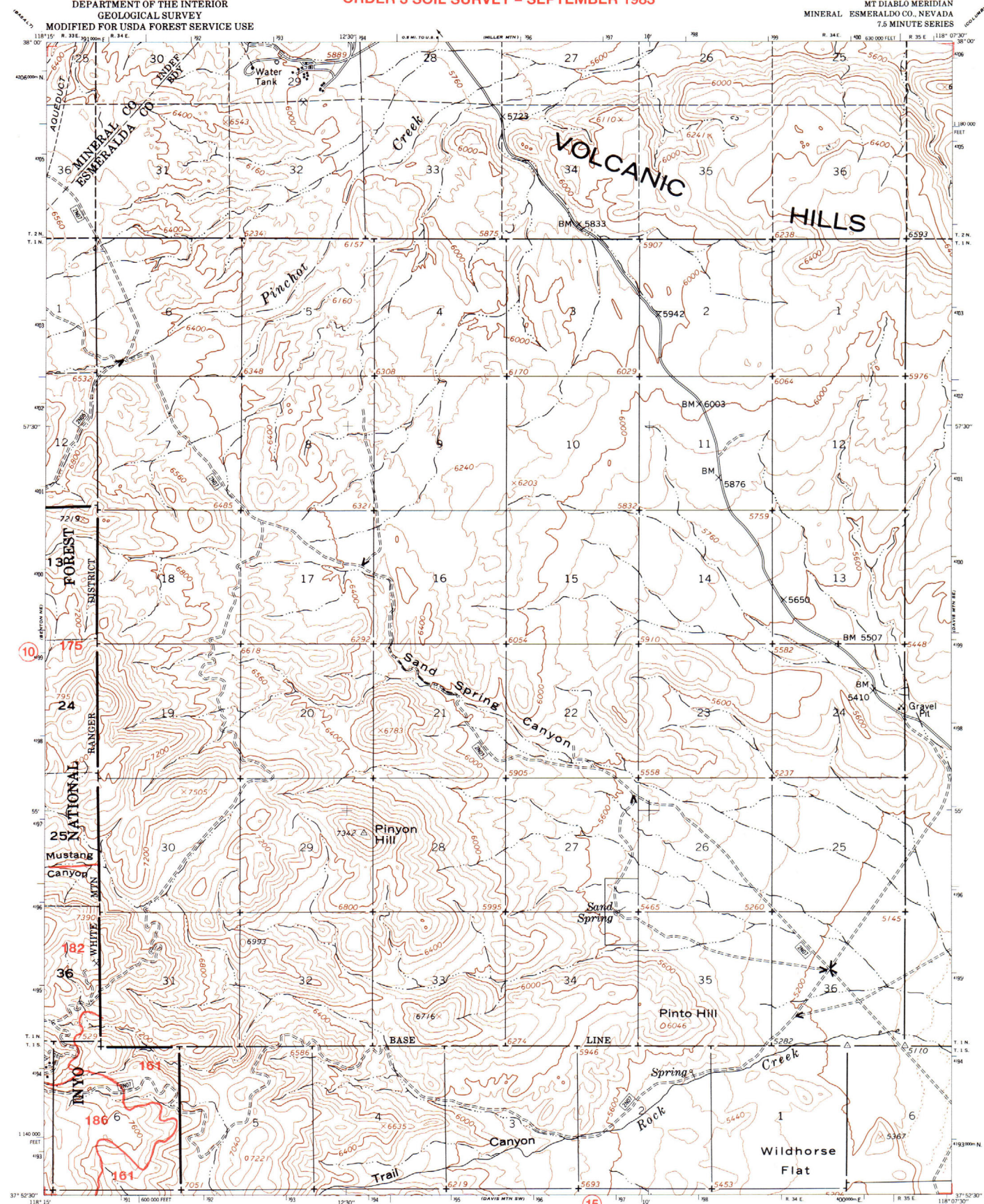
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BENTON NE, NEV
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INYO NATIONAL FOREST AREA - EAST PART
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MINERAL ESERALDO CO. NEVADA
7.5 MINUTE SERIES

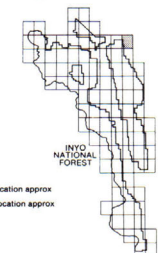
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited: 1982
Polyconic projection, 1927 North American datum
10,000-foot grid based on Nevada coordinate system, west zone
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction grids
furnished by the Pacific Southwest Region



- LEGEND
- National Forest Boundary
 - Alienated Land within the Forest Boundary as of 1984
 - TOWNSHIP AND SECTION LINE CLASSIFICATION
 - Surveyed, Location Reliable
 - Surveyed, Location Approximate
 - Unsurveyed, Protraction
 - Landnet revised according to additional Forest Service evidence
 - City of Los Angeles Land
 - Primary Highway
 - Secondary Highway
 - Improved Light Duty
 - Unimproved Dirt
 - Trail
 - Locked Gate
 - Barrier
 - Railroad
 - Withdrawn BLM Land



11
DAVIS MTN NW, NEV
N3752.5 W11807.5/7.5
(449-2C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

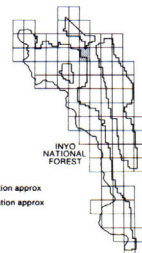
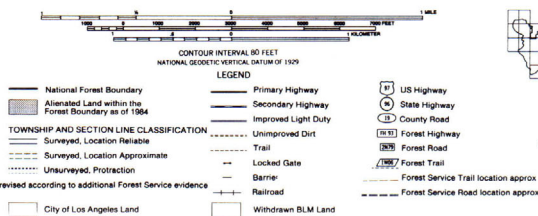
GLASS MTN SE QUADRANGLE
MT DIABLO MERIDIAN
MONO CO. CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1962
Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system zone 3
1000 metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



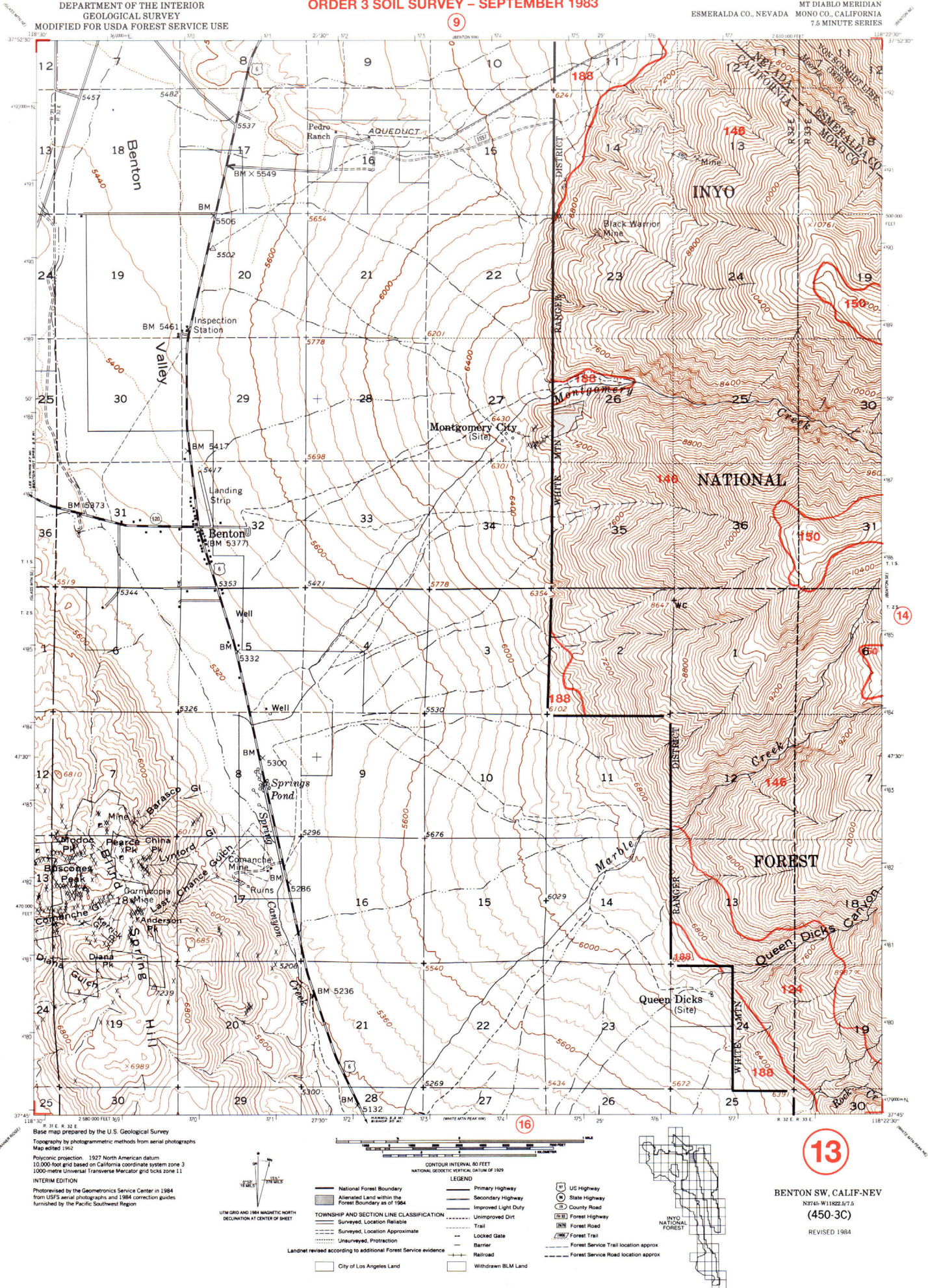
12

GLASS MTN SE, CALIF
N374G-W11880.7.5
(451-4C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

BENTON SW QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDA CO., NEVADA MONO CO., CALIFORNIA
7.5 MINUTE SERIES



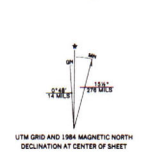
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

BENTON SE QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDA CO., NEVADA MONO CO., CALIFORNIA
7.5 MINUTE SERIES



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1962
Polyconic projection 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone
1,000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatrix Service
Center in 1984 from USFS aerial photography
and 1984 correction guide furnished by
the Pacific Southwest Region



CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

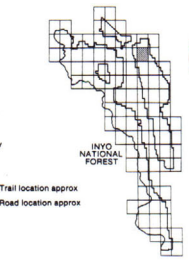
TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- - - - - Surveyed, Location Approximate
- Unsurveyed, Projection
- Landnet revised according to additional Forest Service evidence

Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad

US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail

Forest Service Trail location approx
Forest Service Road location approx



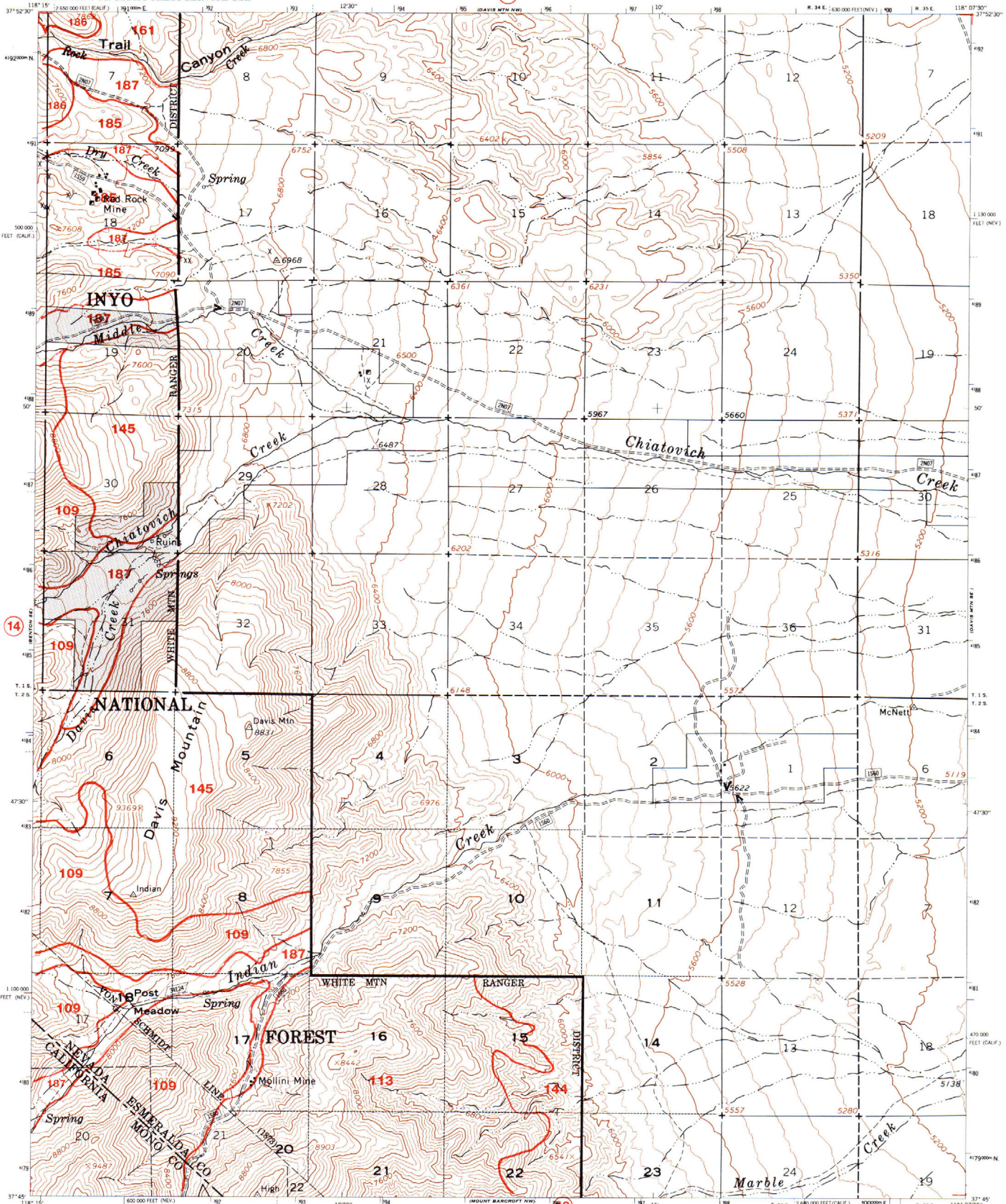
14

BENTON SE, CALIF-NEV
N8746-W1816/7.5
(450-4C)
REVISED 1984

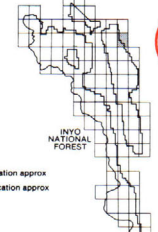
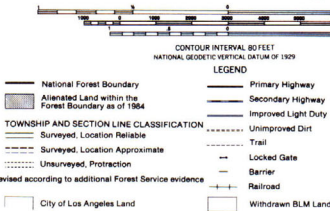
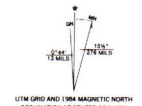
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

DAVIS MTN SW QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDO CO., NEVADA MONO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1963
Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service
Center in 1984 from USGS aerial photography
and 1984 correction guides furnished by
the Pacific Southwest Region

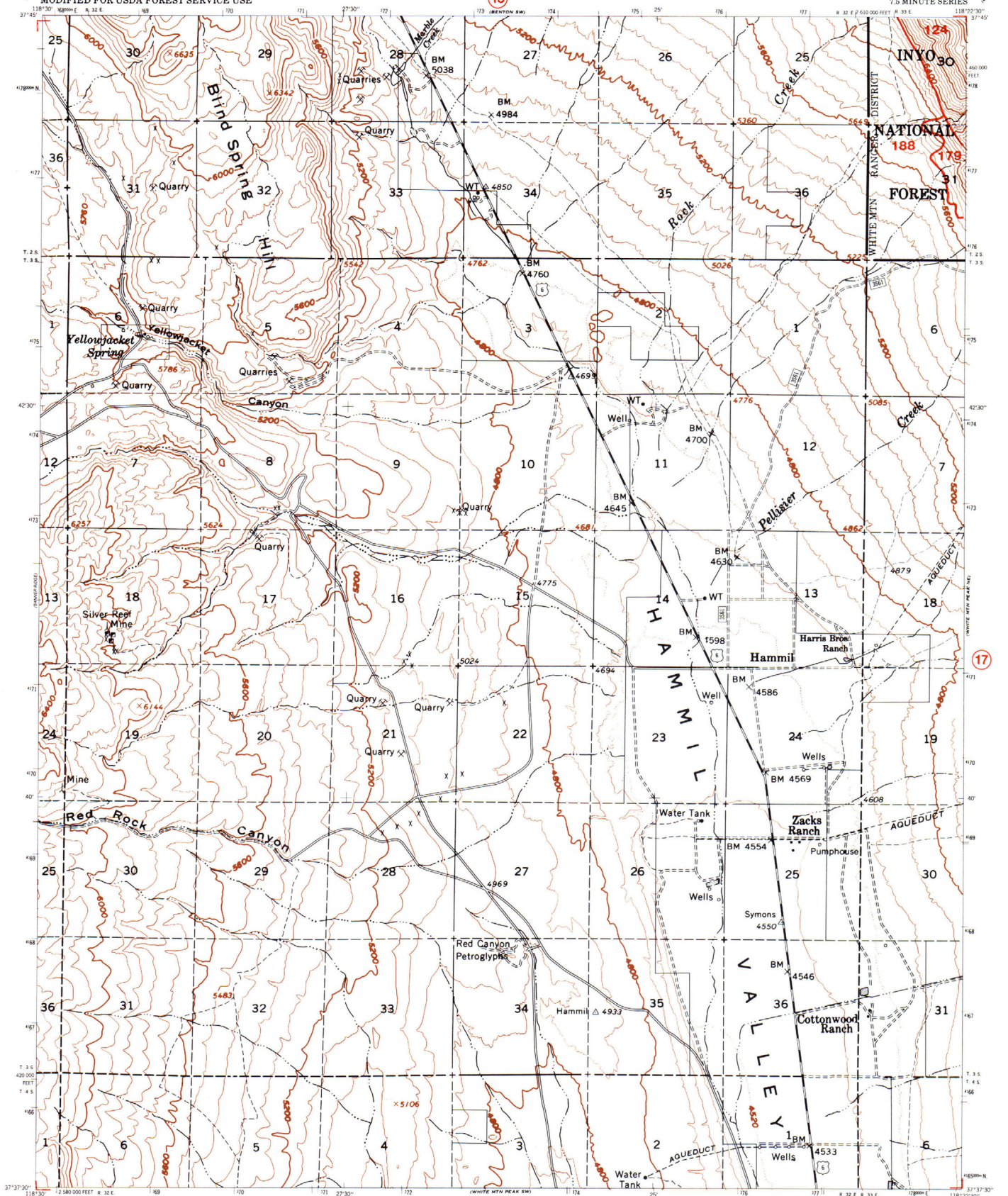


DAVIS MTN SW, CALIF-NEV
N3740-W11807.5/7.5
(449-3C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

WHITE MTN PEAK NW QUADRANGLE
MT DIABLO MERIDIAN
MONO CO., CALIFORNIA
7.5 MINUTE SERIES

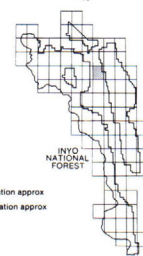


Base map prepared by the U.S. Geological Survey
Topography by photogrammetric method from aerial photographs
Map edited 1982
Polyconic projection, 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
1,000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary	Primary Highway	US Highway
Alienated Land within the Forest Boundary as of 1964	Secondary Highway	State Highway
Township and Section Line Classification	Improved Light Duty	County Road
Surveyed, Location Reliable	Unimproved Dirt	Forest Highway
Surveyed, Location Approximate	Trail	Forest Road
Unsurveyed, Protection	Locked Gate	Forest Trail
Landnet revised according to additional Forest Service evidence	Barrier	Forest Service Trail location approx
City of Los Angeles Land	Railroad	Forest Service Road location approx
Withdrawn BLM Land	Water Tank	



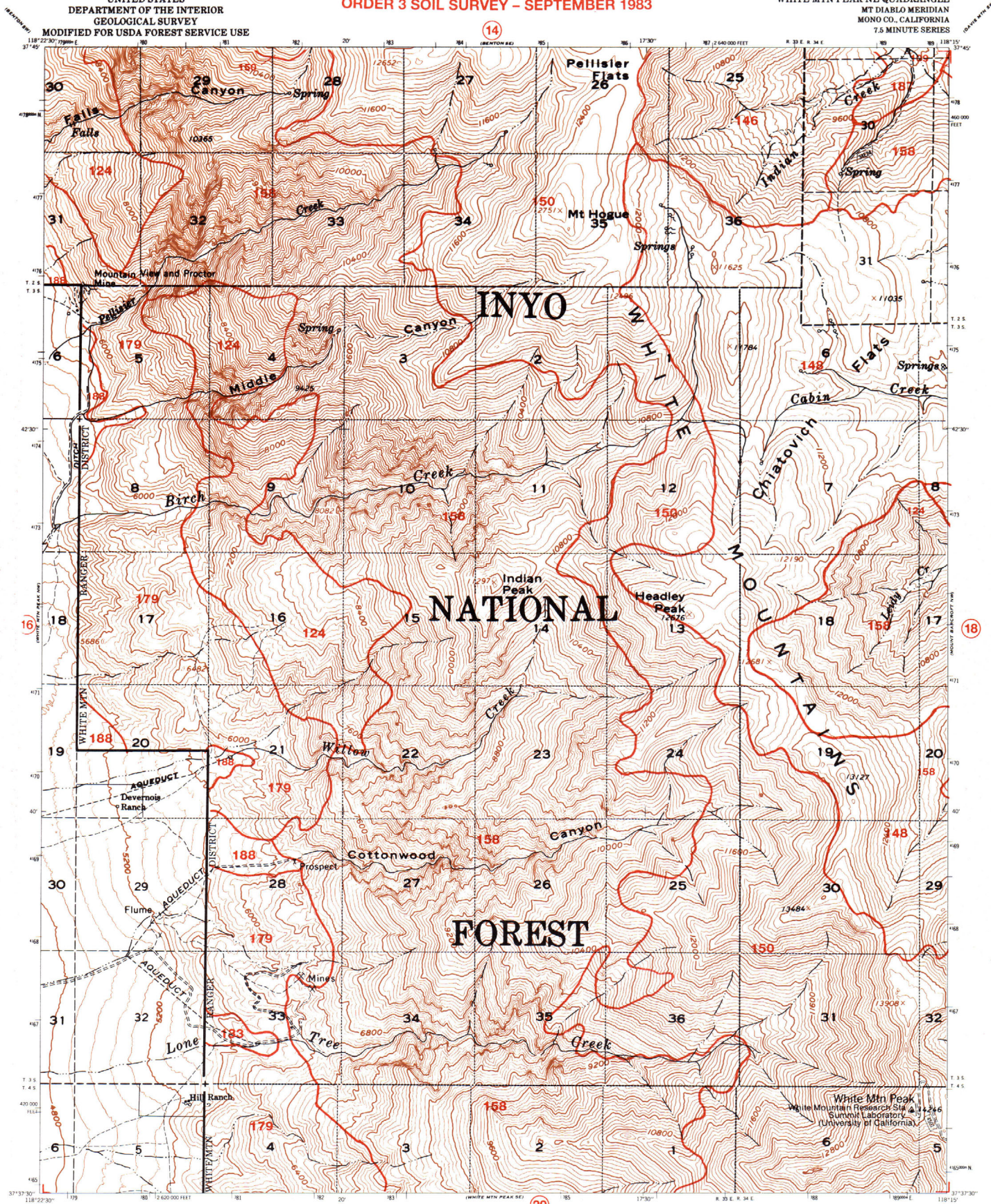
16

WHITE MTN PEAK NW, CALIF
N3737 & W11822.5/7.5
(432-2C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

WHITE MTN PEAK NE QUADRANGLE
MT DIABLO MERIDIAN
MONO CO., CALIFORNIA
7.5 MINUTE SERIES

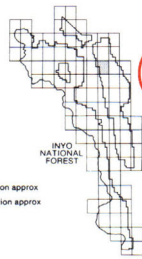
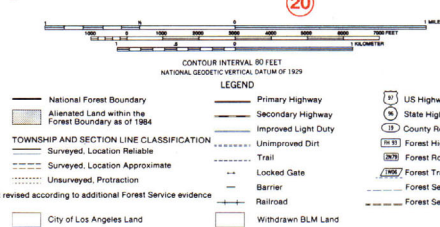
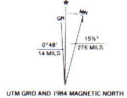
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1962

Polycyclic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION

Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



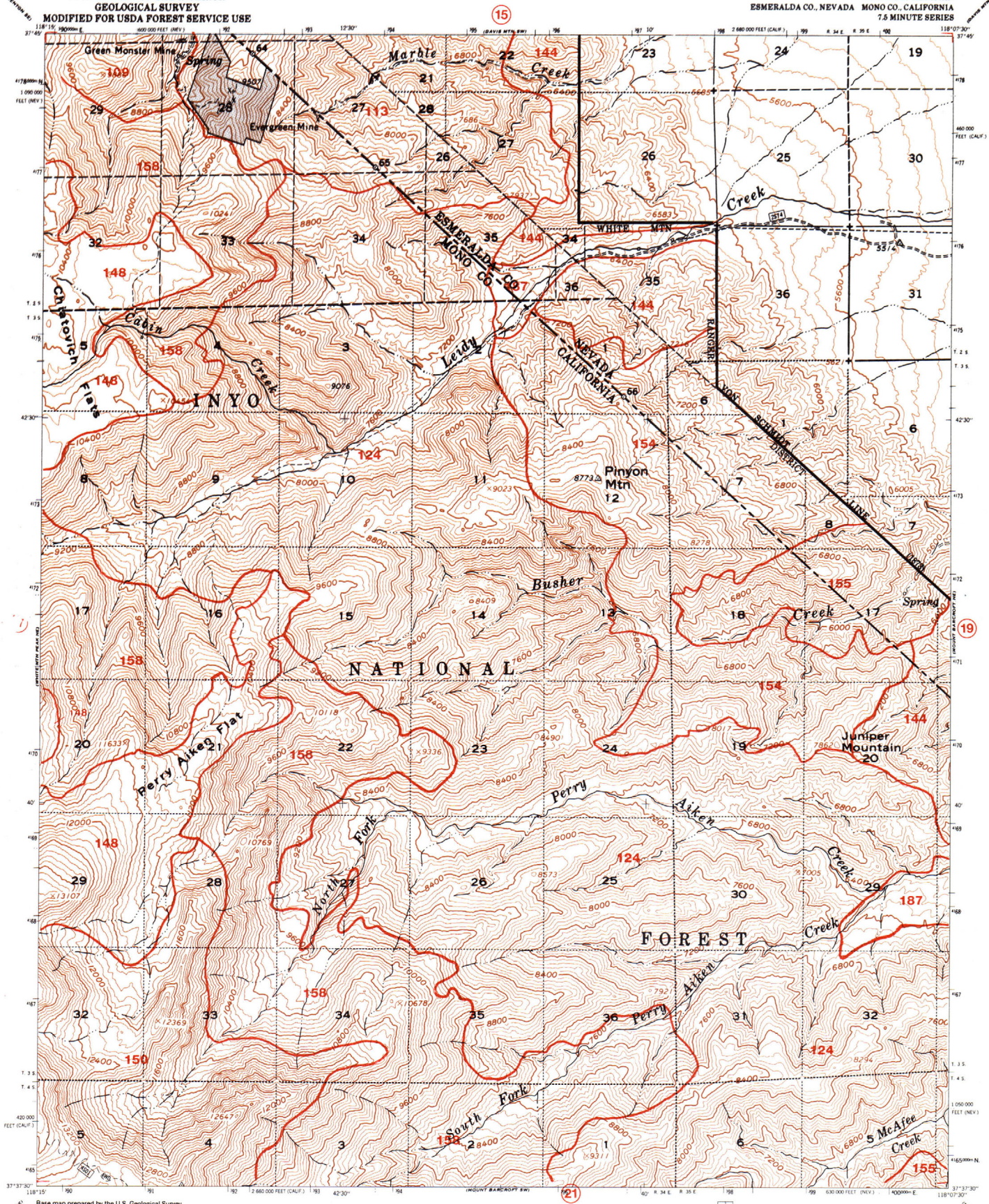
17

WHITE MTN PEAK NE, CALIF
N3737.5 W1815.7.5
(432-1C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

MOUNT BARCROFT NW QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDA CO., NEVADA MONO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

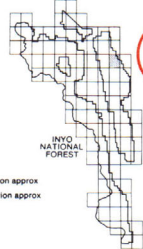
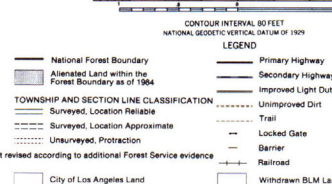
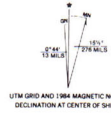


Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1962

Polynomial projection, 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone
1000-metre Universal Transverse Mercator grid ticks zone 11

INTERIM EDITION

Photorevised by the Geomatics Service
Center in 1984 from USFS aerial photography
and 1984 correction guides furnished by
the Pacific Southwest Region



18

MOUNT BARCROFT NW, CALIF-NEV

N3737.5-W11807.5/7.5

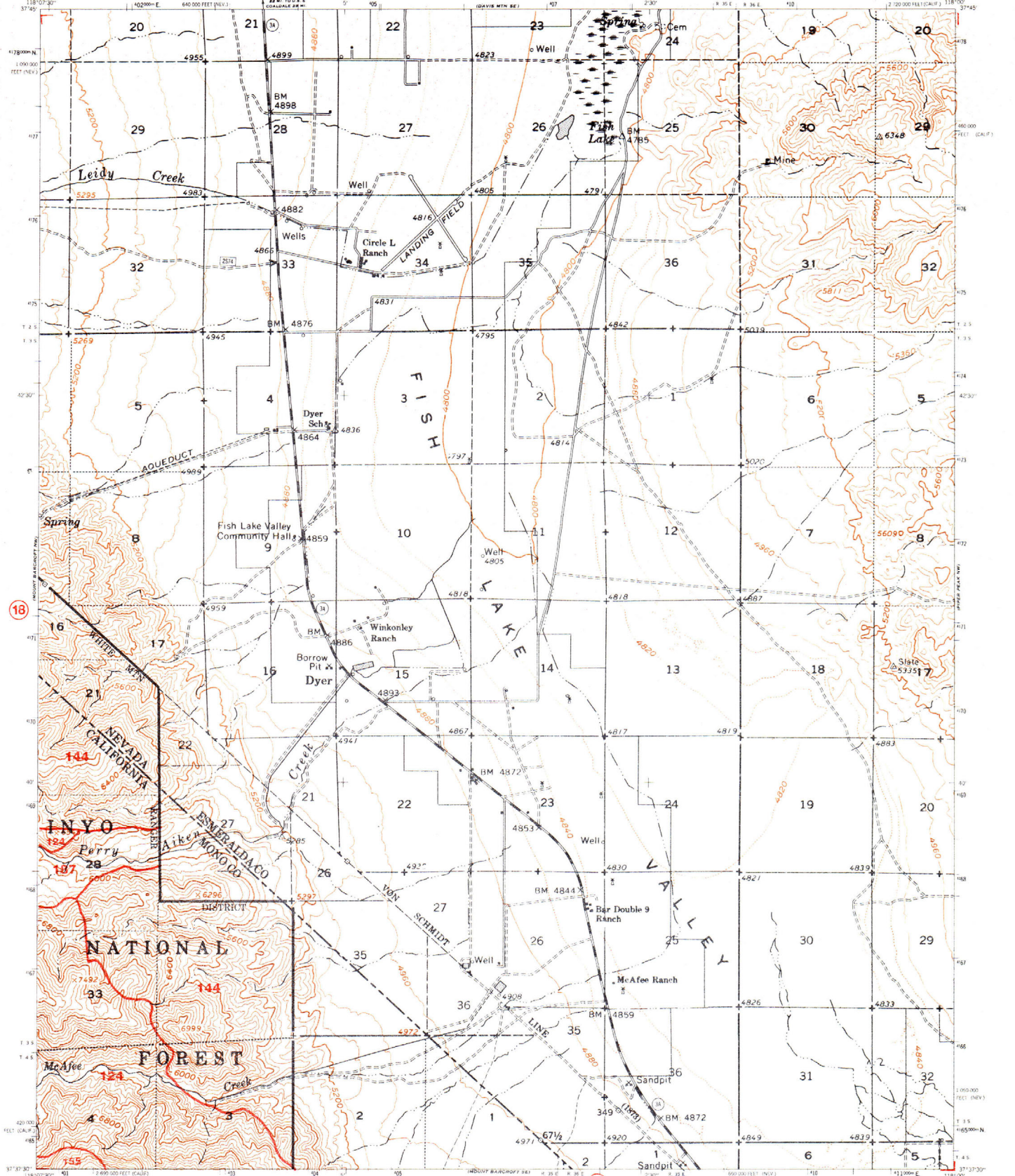
(431-2C)

REVISED 1984

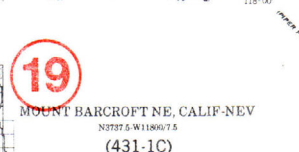
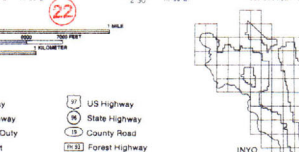
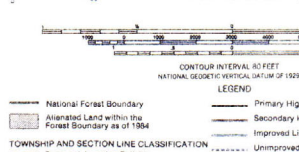
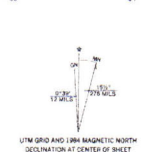
INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

MOUNT BARCROFT NE QUADRANGLE
MT DIABLO MERIDIAN
ESMERALDO CO., NEVADA MONO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



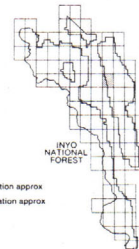
Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1982
Polyconic projection - 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone
1000-meter Universal Transverse Mercator and ticks zone 11
INTERIOR EDITION
Photorevised by the Geomatics Service
Center in 1985 from USFS aerial photography
and 1984 correction guides furnished by
the Pacific Southwest Region



WHITE MTN PEAK SE QUADRANGLE
MT DIABLO MERIDIAN
MONO CO., CALIFORNIA
7.5 MINUTE SERIES

A detailed topographic map of the Inyo National Forest in California. The map features a grid system with numbers 1 through 32 along the edges. Key geographical features include the Inyo Mountains, White Mountain, and various canyons such as Jeffrey Canyon, Sabies Canyon, Straight Canyon, and Sacramento Canyon. The map also shows several mines, including Jeffrey Mine, Milner Mine, Copper Queen Mine, Chalfant Mine, and Moulas Mine. A network of roads is depicted, including Highway 188, Highway 158, and Highway 154. The map includes contour lines indicating elevation, with peaks reaching over 11,000 feet. The text 'INYO NATIONAL FOREST' is prominently displayed in the center. The map is oriented with North at the top.


 37 US Highway
 96 State Highway
 23 County Road
 10 83 Forest Highway
 2675 Forest Road
 7000 Forest Trail
 --- Forest Service Trail location approx
 --- Forest Service Road location approx

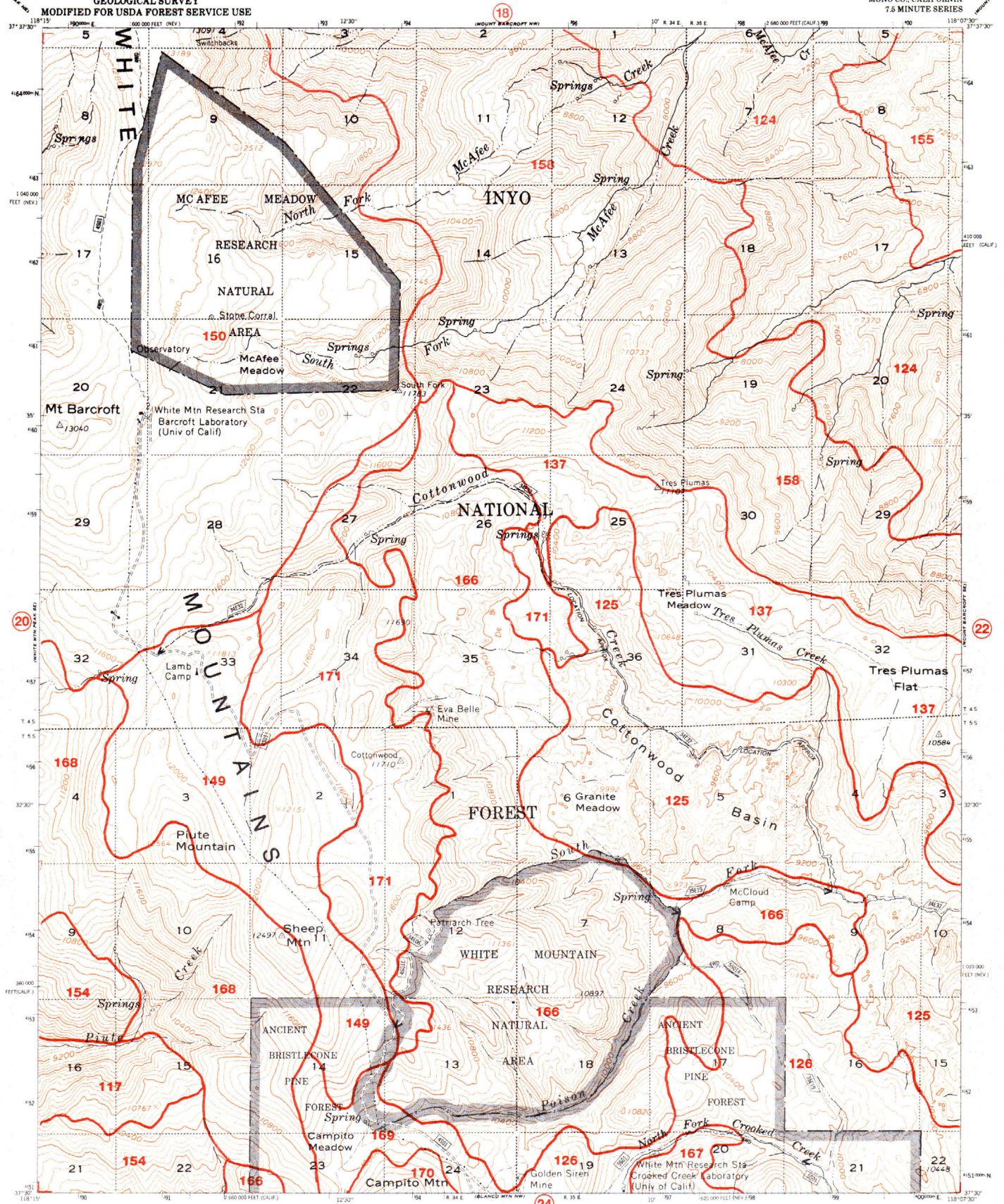


WHITE MTN PEAK SE, CALIF
N3730-W11815/7.5
(432-4C)
REVISED 1984

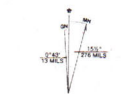
INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

MOUNT BARCROFT SW QUADRANGLE
MT DIABLO MERIDIAN
MONO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1962
Polyconic projection, 1927 North American datum
10,000-foot grid based on California coordinate system zone 11
1000-meter Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



Legend

- National Forest Boundary
- Altered Land within the Forest Boundary as of 1984
- TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction
- Landnet revised according to additional Forest Service evidence
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Light Duty
- Trail
- Locked Gate
- Barrier
- Railroad

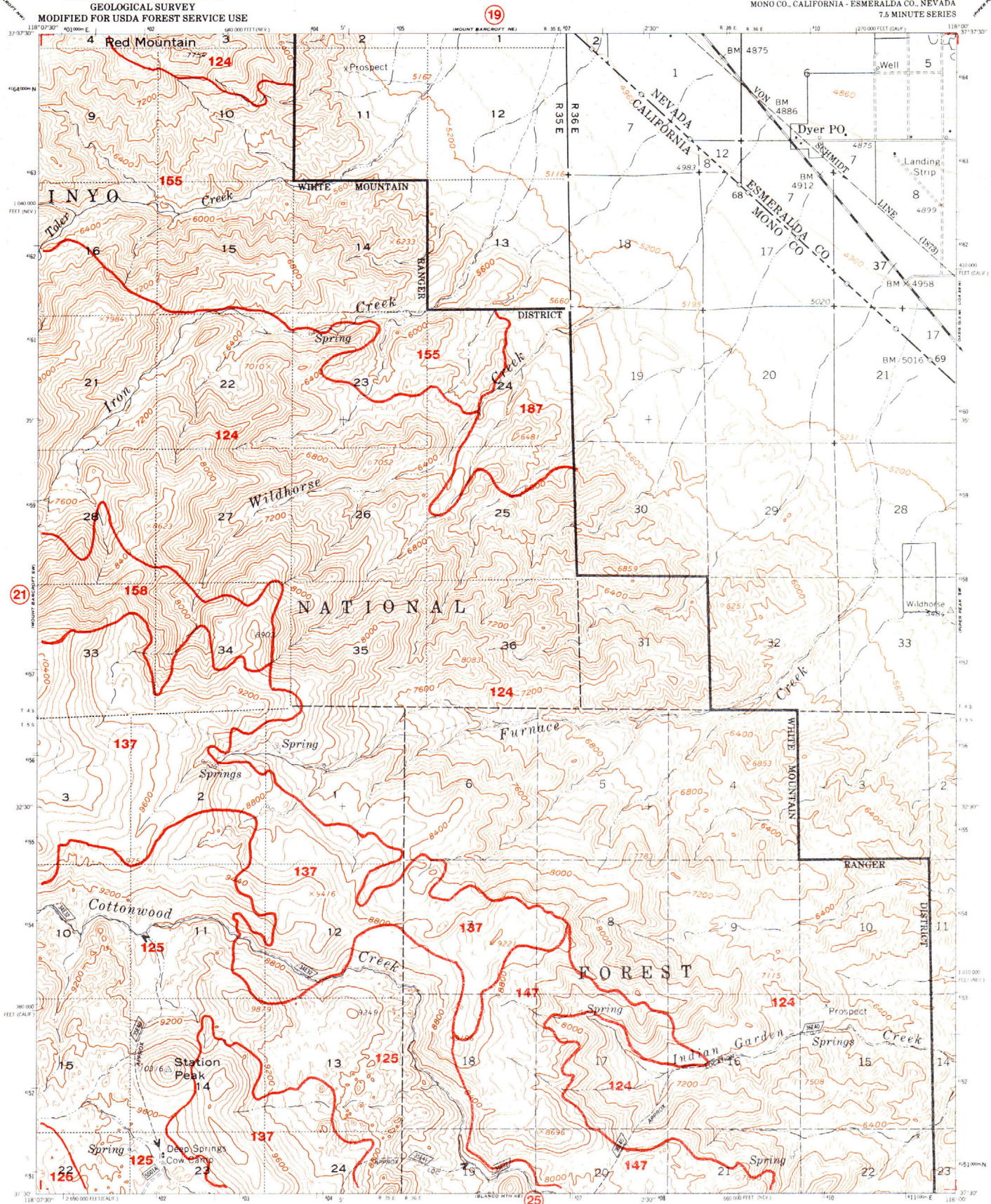
US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx

21
MOUNT BARCROFT SW, CALIF
N 11730 W 11807 S 7.5
(431-3C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

MOUNT BARCROFT SE QUADRANGLE
MT DIABLO MERIDIAN
MONO CO., CALIFORNIA - ESERALDA CO., NEVADA
7.5 MINUTE SERIES



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1962

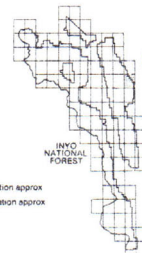
Polyconic projection 1927 North American datum
10,000-foot grid based on California coordinate system zone 3
and Nevada coordinate system, west zone
1000 metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION

Photorevised by the Geomatics Service
Center in 1984 from USGS aerial photography and
1984 correction guides furnished by the
Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

TOWNSHIP AND SECTION LINE CLASSIFICATION
— Surveyed, Location Reliable
--- Surveyed, Location Approximate
... Unsurveyed
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land
Withdrawn BLM Land

LEGEND
— Primary Highway
— Secondary Highway
— Improved Light Duty
— Unimproved Dirt
— Trail
— Locked Gate
— Barrier
— Railroad
— US Highway
— State Highway
— County Road
— Forest Highway
— Forest Road
— Forest Trail
— Forest Service Trail location approx
— Forest Service Road location approx



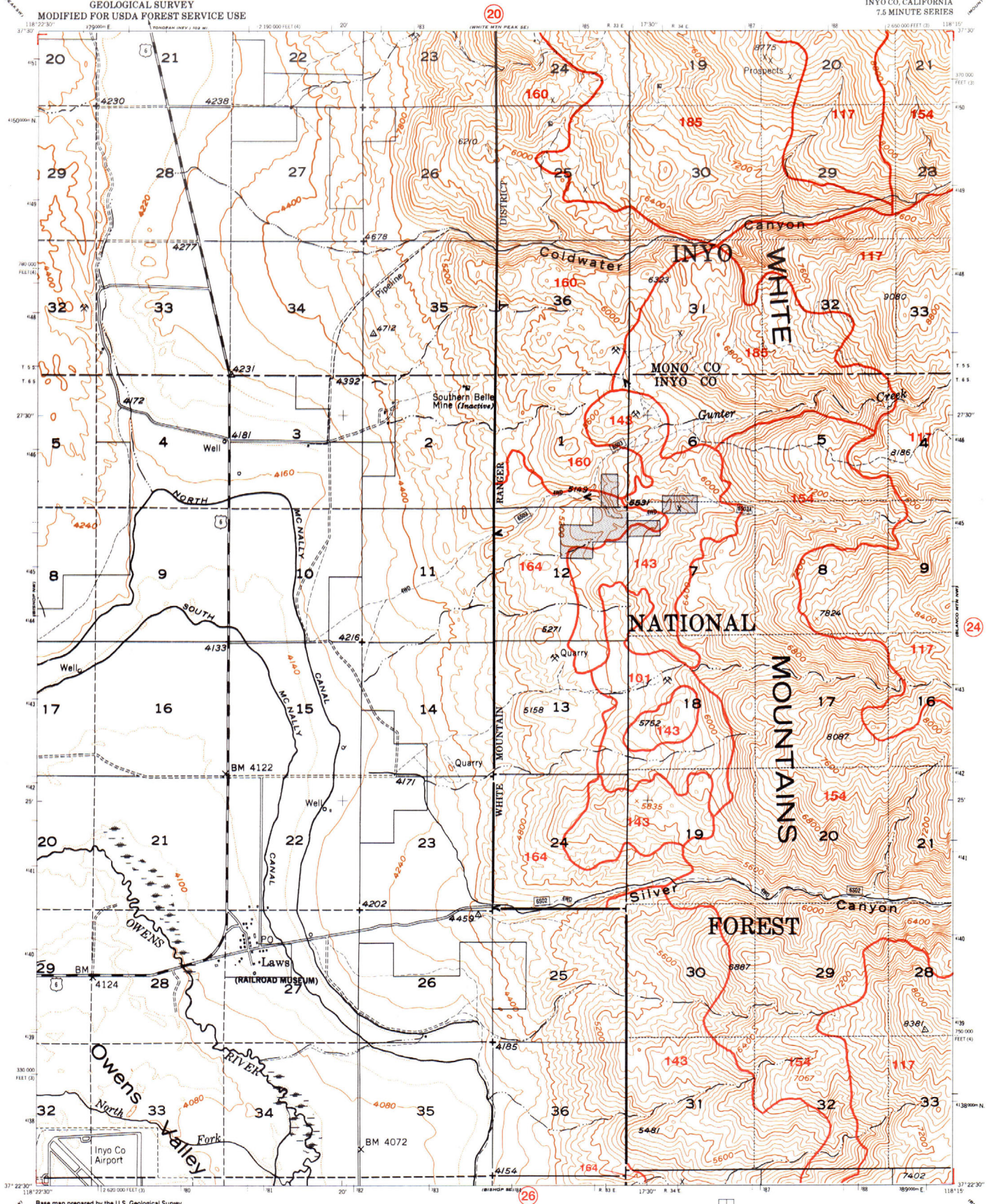
22

MOUNT BARCROFT SE, CALIF-NEV
N8730 W18800-7.5
(431-4C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

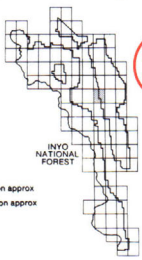
BISHOP NE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1949
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 3 and 4
1000-meter Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land
Withdrawn BLM Land

- LEGEND
- National Forest Boundary
 - Altered Land within the Forest Boundary as of 1984
 - TOWNSHIP AND SECTION LINE CLASSIFICATION
 - Surveyed, Location Reliable
 - Surveyed, Location Approximate
 - Unsurveyed, Protraction
 - Primary Highway
 - Secondary Highway
 - Improved Light Duty
 - Unimproved Dirt
 - Trail
 - Locked Gate
 - Barrier
 - Railroad
 - US Highway
 - State Highway
 - County Road
 - Forest Highway
 - Forest Road
 - Forest Trail
 - Forest Service Trail location approx
 - Forest Service Road location approx

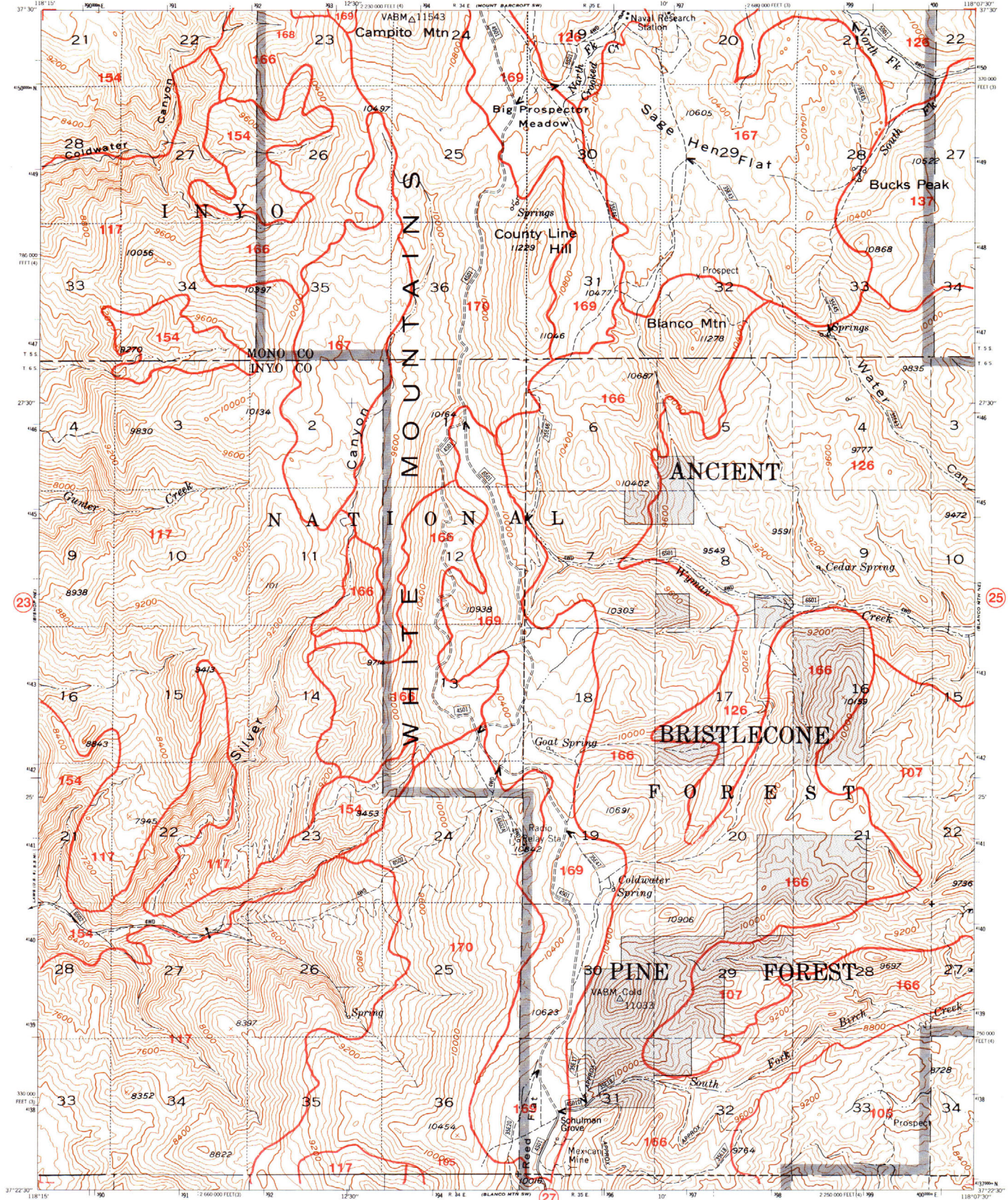


BISHOP NE, CALIF
N3722.5 W11815.7.5
(413-1C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

BLANCO MTN NW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. - MONO CO. CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1951

Polycyclic projection. 1927 North American datum 3 and 4
10,000 foot grid based on California coordinate system zone
1000-meter Universal Transverse Mercator grid (zone 11)

INTERIM EDITION

Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



Landnet revised according to additional Forest Service evidence

LEGEND

National Forest Boundary
Alienated Land within the
Forest Boundary as of 1984
Township and Section Line Classification
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Barrier
Railroad

Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Forest Service Trail location approx
Forest Service Road location approx

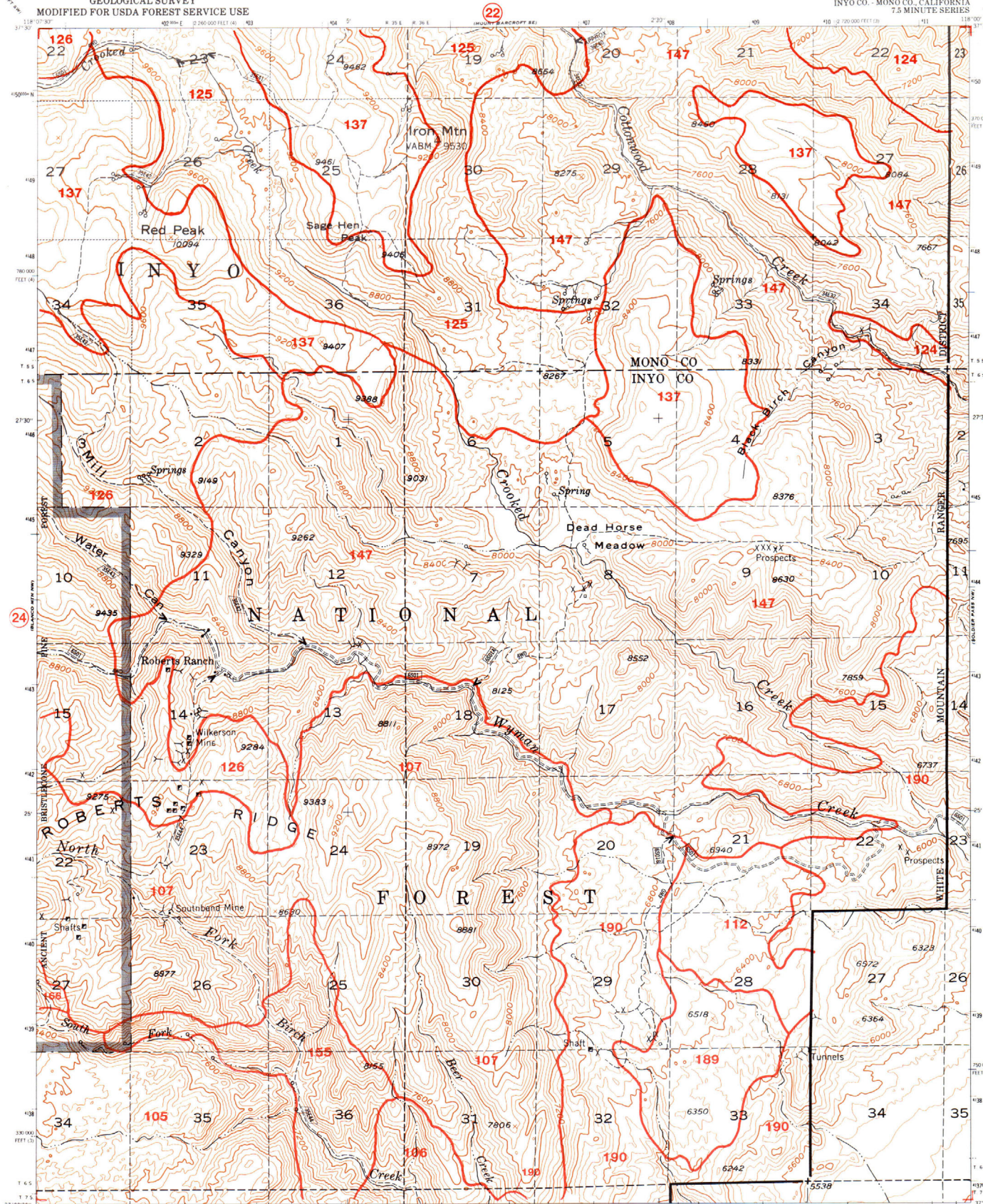
US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Service Trail location approx
Forest Service Road location approx

BLANCO MTN NW, CALIF
N3722.5 W11807.5/5
(412-2C)
REVISED 1984

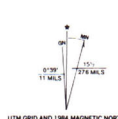
INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

BLANCO MTN NE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. - MONO CO. CALIFORNIA
7.5 MINUTE SERIES

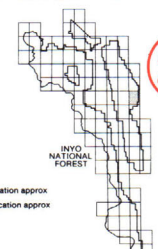
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1951
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 3 and 4
1,000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



- | | | |
|--|---|--|
| <ul style="list-style-type: none"> National Forest Boundary Alienated Land within the Forest Boundary as of 1984 TOWNSHIP AND SECTION LINE CLASSIFICATION Surveyed, Location Reliable Surveyed, Location Approximate Unsurveyed, Protection Barrier Railroad City of Los Angeles Land Withdrawn BLM Land | <ul style="list-style-type: none"> Primary Highway Secondary Highway Improved Light Duty Unimproved Dirt Trail Locked Gate Barrier Railroad Withdrawn BLM Land | <ul style="list-style-type: none"> US Highway State Highway County Road Forest Highway Forest Road Forest Trail Forest Service Trail location approx Forest Service Road location approx |
|--|---|--|

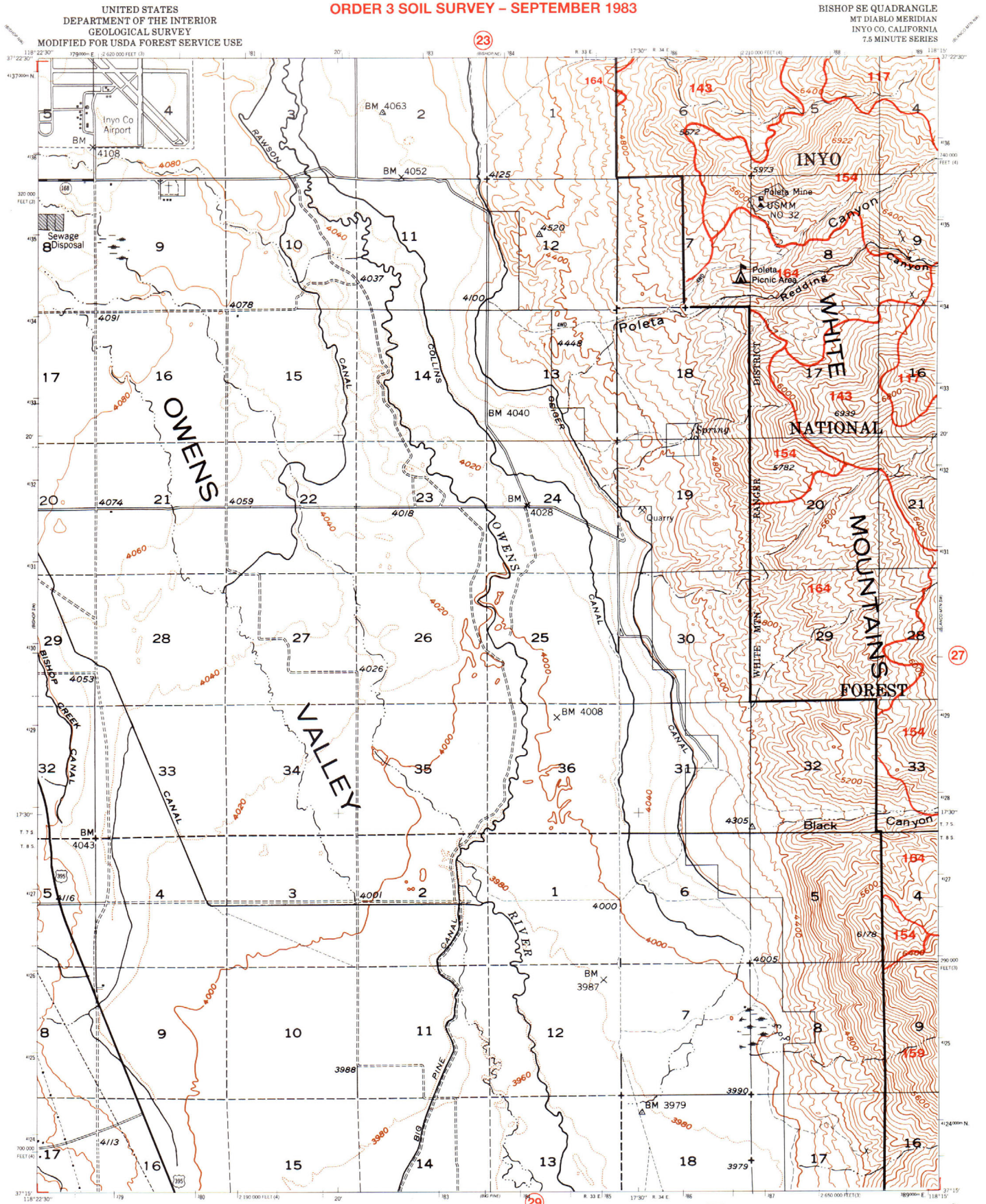


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BLANCO MTN NE, CALIF
NAD83 11N 10W 7.5
(412-1C)
REVISED 1984

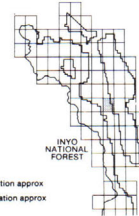
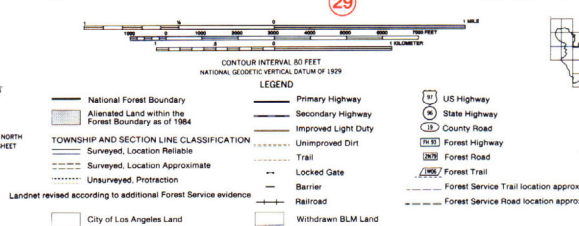
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

BISHOP SE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1949
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 3 and 4
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



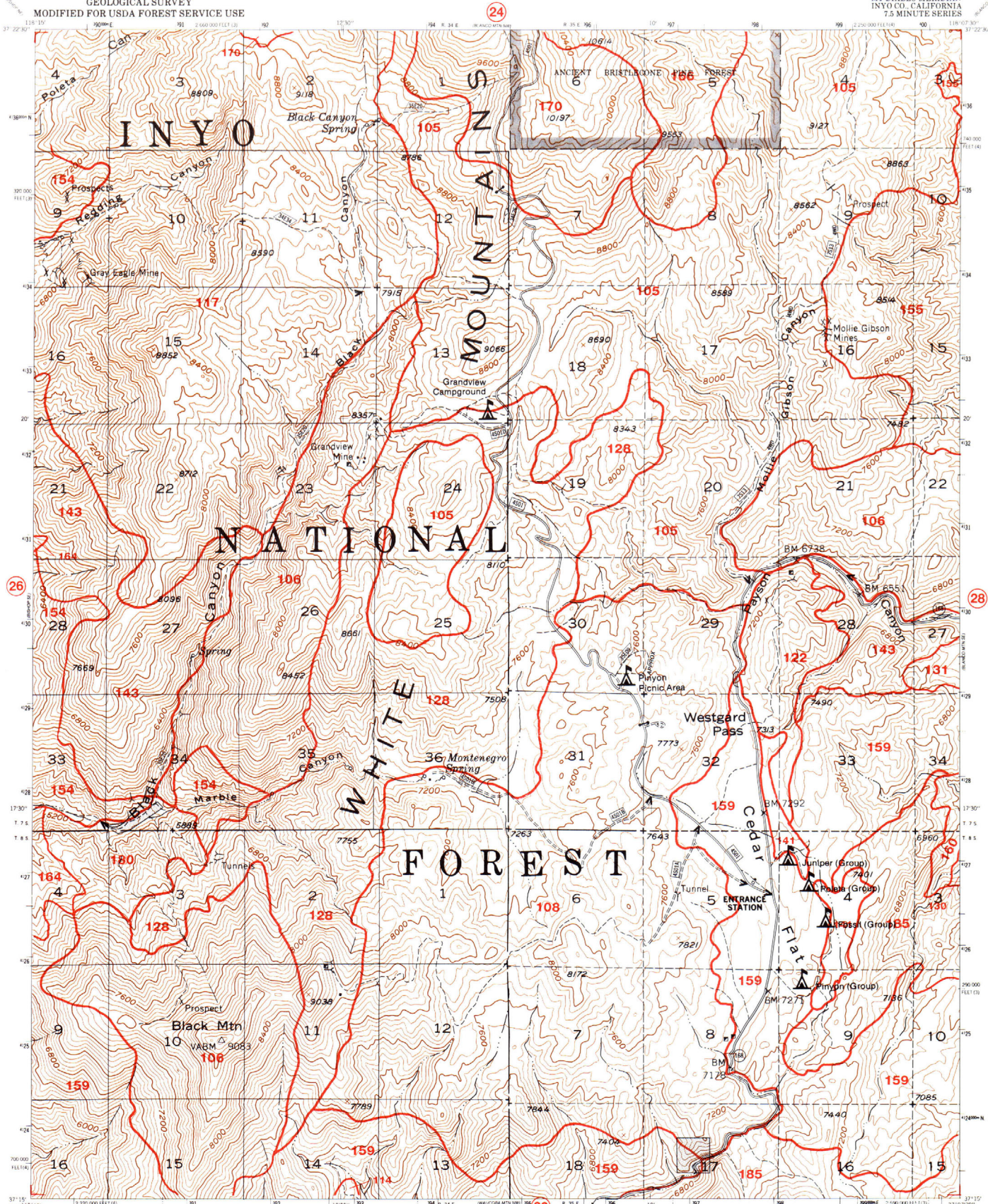
26

BISHOP SE, CALIF
N3715-W11815/7.5
(413-4C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

BLANCO MTN SW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO., CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



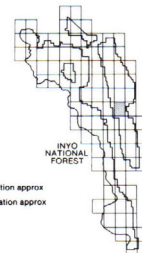
Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1981
Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system zone 3 and 4
1000 metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



Legend
National Forest Boundary
Alienated Land within the Forest Boundary as of 1984
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Landnet revised according to additional Forest Service evidence

Legend
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad

Legend
US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx

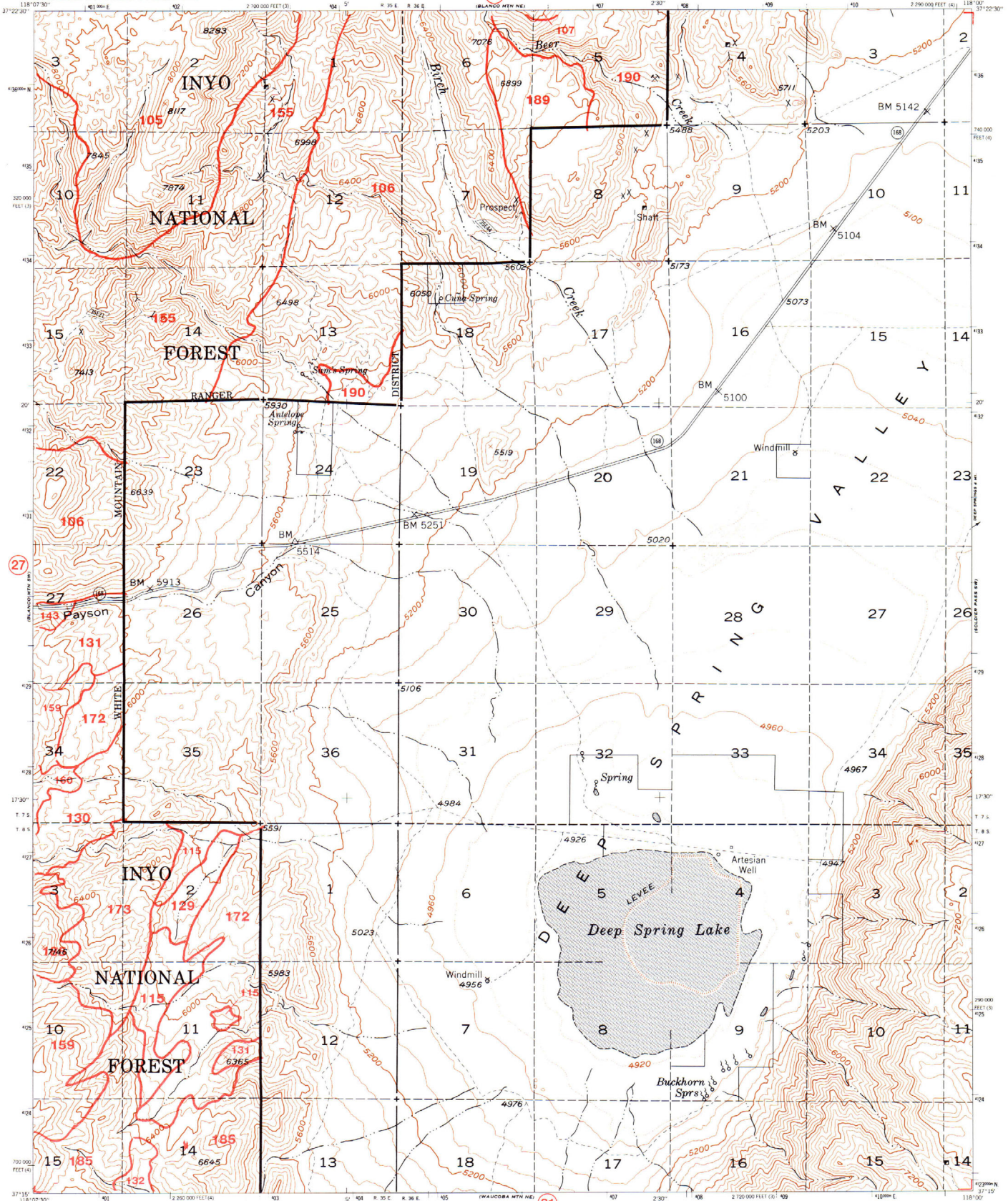


BLANCO MTN SW, CALIF
N315-W11807.5/7.5
(412-3C)
REVISED 1984

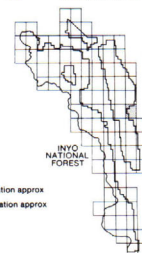
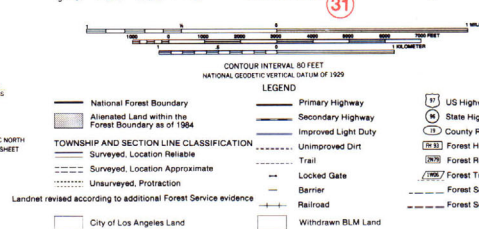
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

BLANCO MTN SE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1961.
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 3 and 4
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



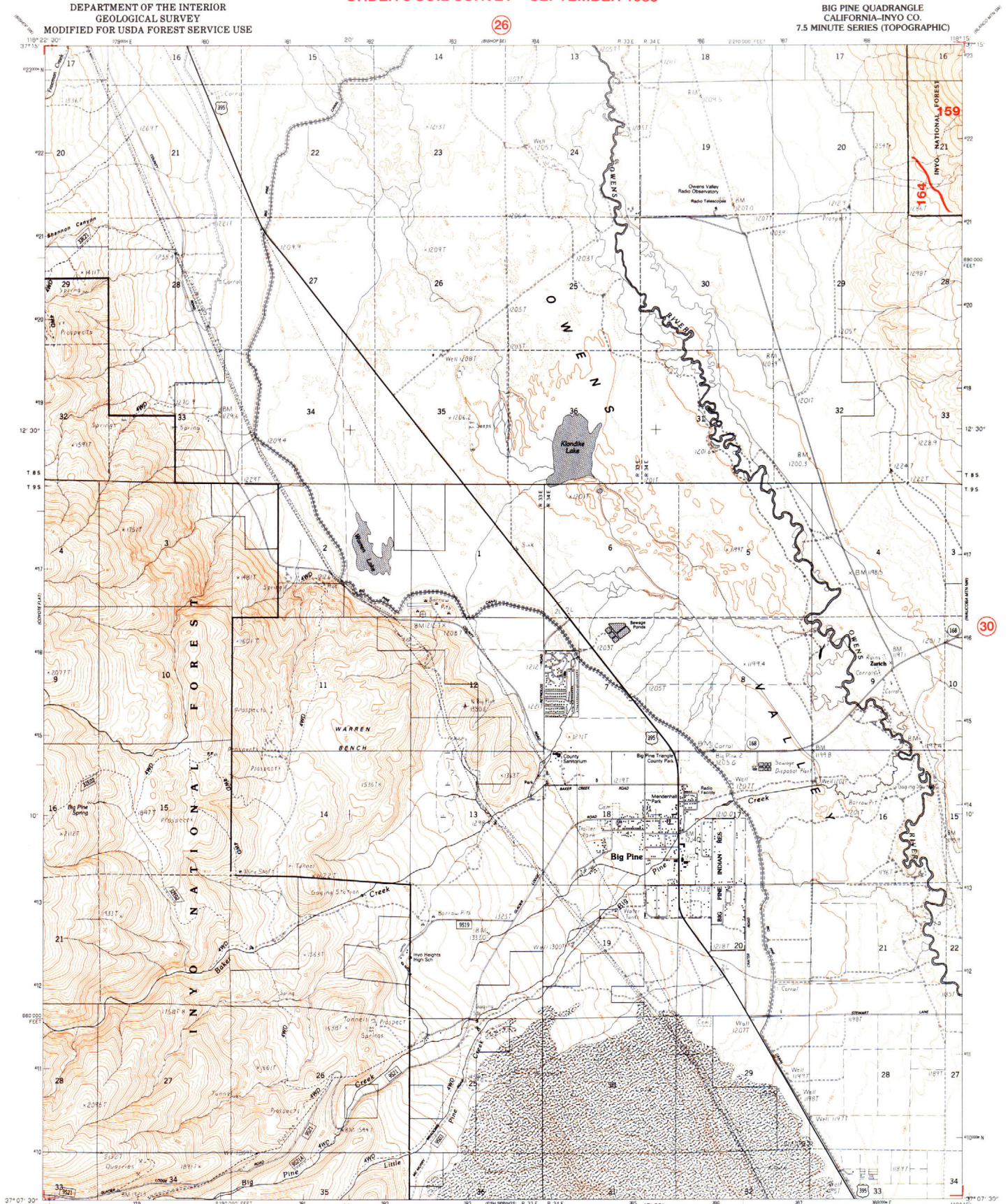
28

BLANCO MTN SE, CALIF
N3715 W11800 7.5
(412-4C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

BIG PINE QUADRANGLE
CALIFORNIA-INYO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



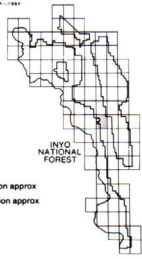
Base map prepared by the U.S. Geological Survey
CONTROL BY U.S. GEOLOGICAL SURVEY
COMPILED FROM AERIAL PHOTOGRAPHIC TAPE
FIELD CHECKED 1980 MAP EDITED 1980
PROJECTION: UTM TRANSVERSE MERCATOR
GRID: 100-METER UNIVERSAL TRANSVERSE MERCATOR
UTM GRID DECLINATION: 1980 WEST
UTM MAGNETIC NORTH DECLINATION: 1980 EAST
VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM: 1983 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983,
move the projection lines as shown by dashed corner ticks
(9 meters north - 85 meters east)
Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction grids
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



LEGEND

- National Forest Boundary
- Alienated Land within the Forest Boundary as of 1984
- TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protection
- Landset revised according to additional Forest Service evidence
- City of Los Angeles Land
- Withdrawn BLM Land
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- Locked Gate
- Barrier
- Railroad
- US Highway
- State Highway
- County Road
- Forest Highway
- Forest Road
- Forest Trail
- Forest Service Trail location approx
- Forest Service Road location approx



TO CONVERT METERS TO FEET MULTIPLY BY 3.2808
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
CONTR. ELEVATIONS SHOWN TO THE NEAREST 1 METERS
OTHER ELEVATIONS SHOWN TO THE NEAREST METERS

29

BIG PINE, CALIF.
PROVISIONAL EDITION 1984
N307.5-W11815/7.5
(393-1C)

WAUCOBA MTN NW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO, CALIFORNIA
7.5 MINUTE SERIES

This is a detailed topographic map of the Inyo National Forest in California. The map features brown contour lines indicating elevation, with major peaks and ridges labeled. Key geographical features include the Owens Valley, the Inyo Mountains, and the Soldier Canyon. The map is overlaid with a grid of section numbers (1-36) and township/range coordinates. Notable landmarks and locations marked include the Tolt House Site (Historical Area), Wilkerson Springs, Ulymeyer Spring, Graham Ranch (Site), and McMurtry Spring. The map also shows various roads, including the Westgard Road and the Soldier Canyon Road. The Inyo National Forest boundary is clearly delineated, and the map includes a scale bar and a north arrow.

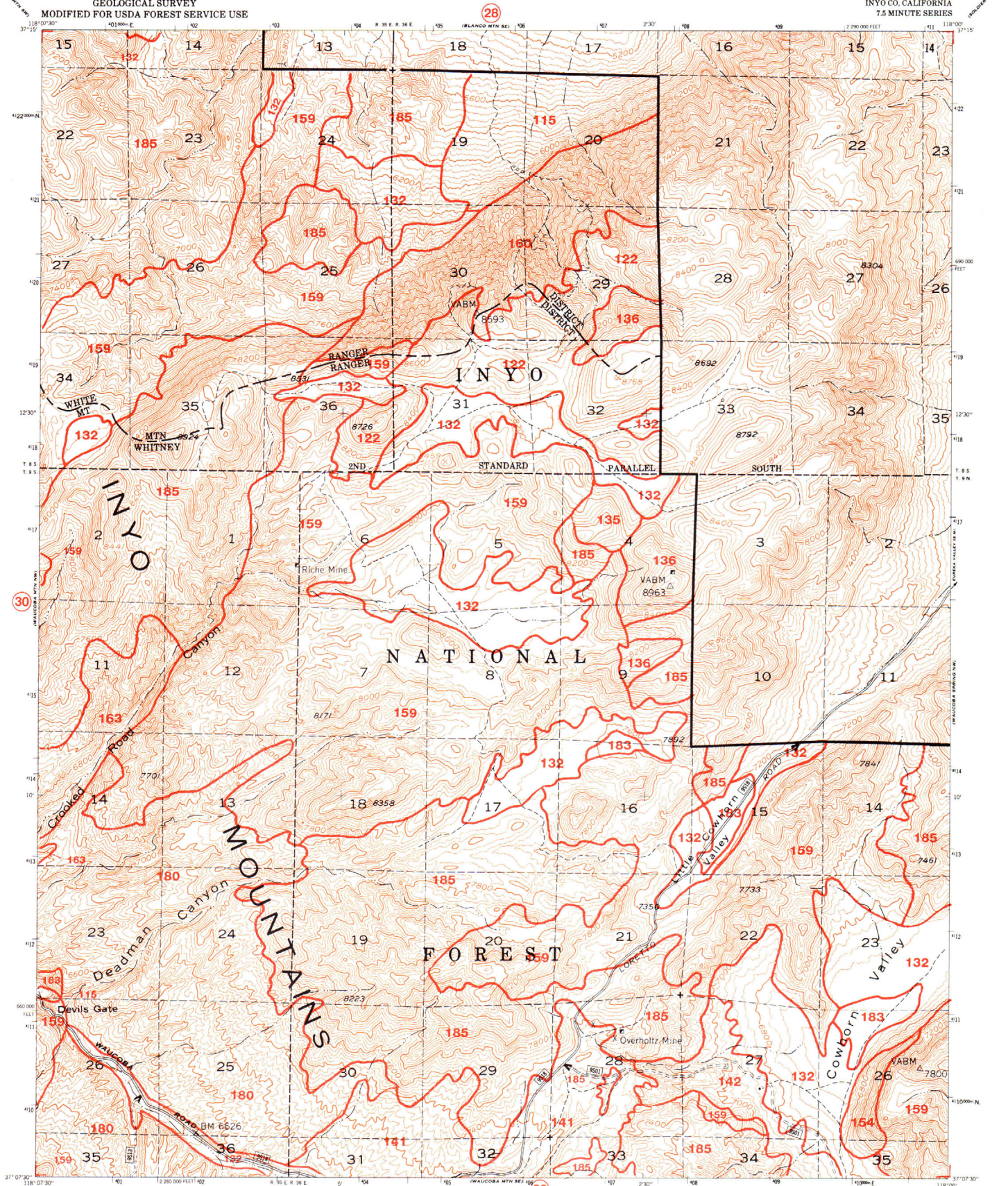
WAUCOBA MTN NW
N3707.5-W11807.5/7.1
(392-2C)
REVISED 1984

REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

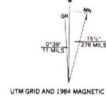
WAUCOBA MTN NE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO, CALIFORNIA
7.5 MINUTE SERIES



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1951

Polycyclic projection. 1927 North American datum
10,000-foot and based on California coordinate system zone 4
1000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION

Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



Legend

- National Forest Boundary
- Alienated Land within the Forest Boundary as of 1984
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction
- Landnet revised according to additional Forest Service evidence
- City of Los Angeles Land
- Withdrawn BLM Land
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- Locked Gate
- Barrier
- Railroad

CONTOUR INTERVAL: 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Legend

- US Highway
- State Highway
- County Road
- Forest Highway
- Forest Road
- Forest Trail
- Forest Service Trail location approx
- Forest Service Road location approx



31

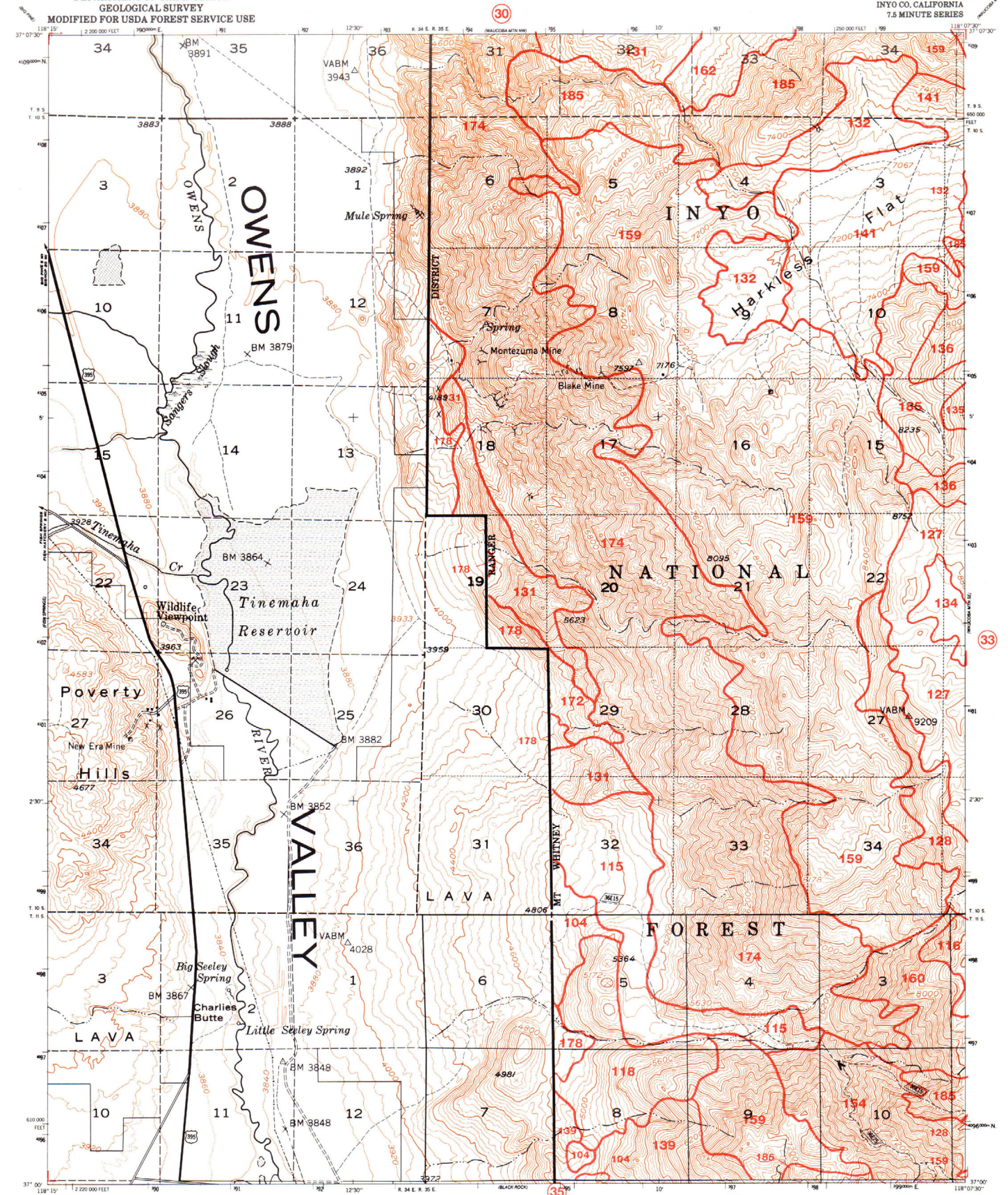
WAUCOBA MTN NE, CALIF
N3977.5-W118067.5
(392-1C)

REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

WAUCOBA MTN SW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES

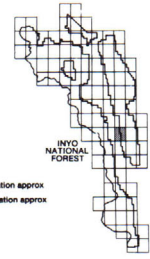
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1951
Polyconic projection, 1927 North American datum
10,000-foot grid based on California coordinate system zone 4
1,000-meter Universal Transverse Mercator grid (zone 11)
INTERIM EDITION
Photorevised by the Geomatrix Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

LEGEND
National Forest Boundary
Altered Land within the Forest Boundary as of 1984
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land
Withdrawn BLM Land
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad



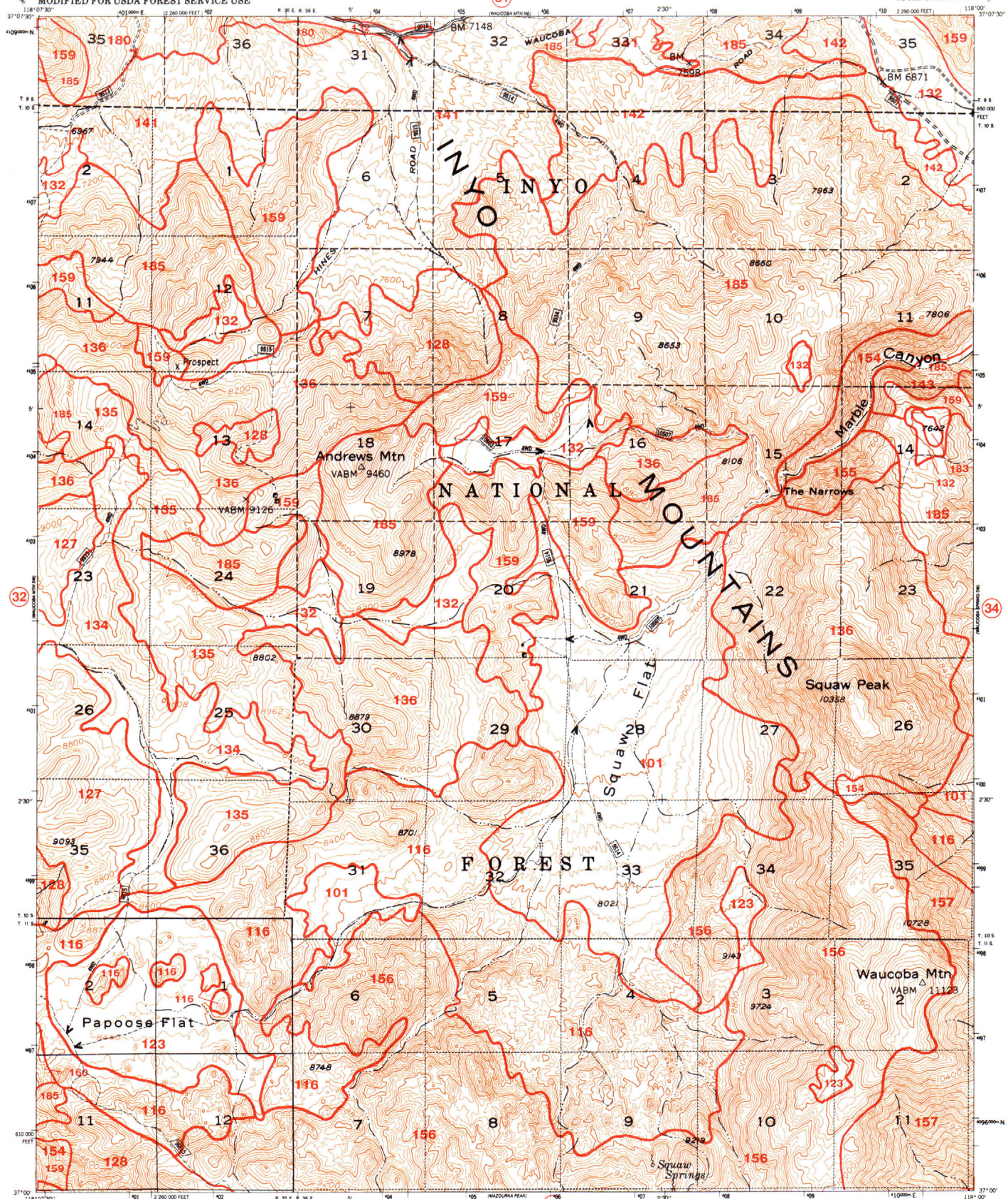
32

WAUCOBA MTN SW, CALIF
N3700-W11807.5/7.5
(392-3C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

WAUCOBA MTN SE QUADRANGLE
MT DIABLO MERIDIAN
INYO CO, CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map dated 1951

Projection: 1927 North American datum
10,000-foot grid based on California coordinate system zone 4
1000-metre Universal Transverse Mercator grid ticks zone 11

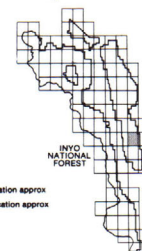
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
From USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

Legend
National Forest Boundary
Altered Land within the
Forest Boundary as of 1984
Township and Section Line Classification
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Landmark revised according to additional Forest Service evidence

Legend
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad

Legend
US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx



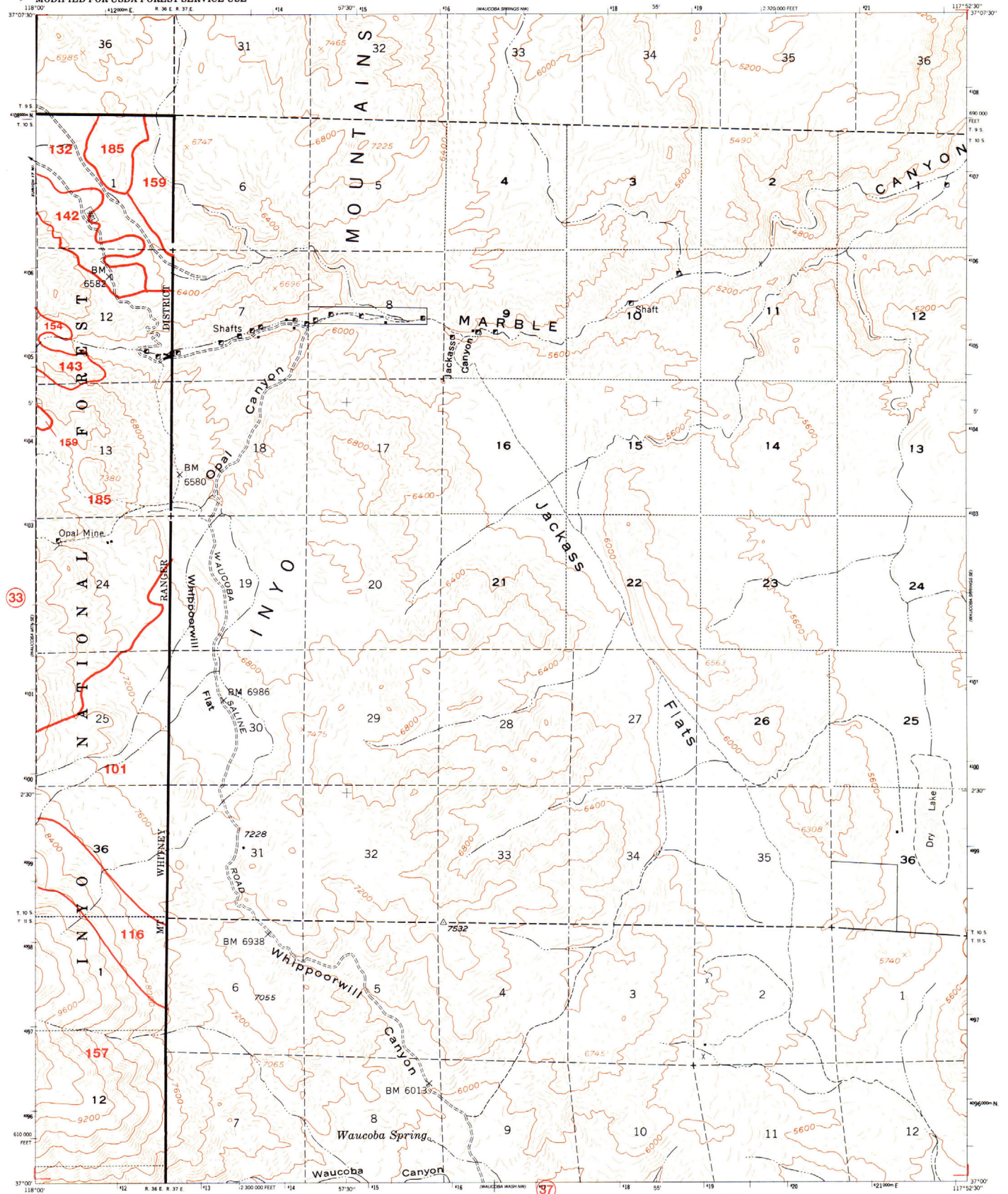
33

WAUCOBA MTN SE, CALIF
N7700-W11800/7.5
(392-4C)
REVISED 1984

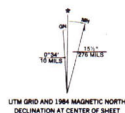
INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

WAUCOBA SPRING SW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

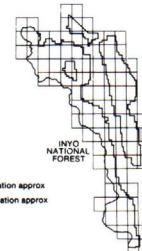


Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1958
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 4
1,000-metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatrix Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



Legend
National Forest Boundary
Altered Land within the Forest Boundary as of 1984
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protection
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land
Withdrawn BLM Land
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad

US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx



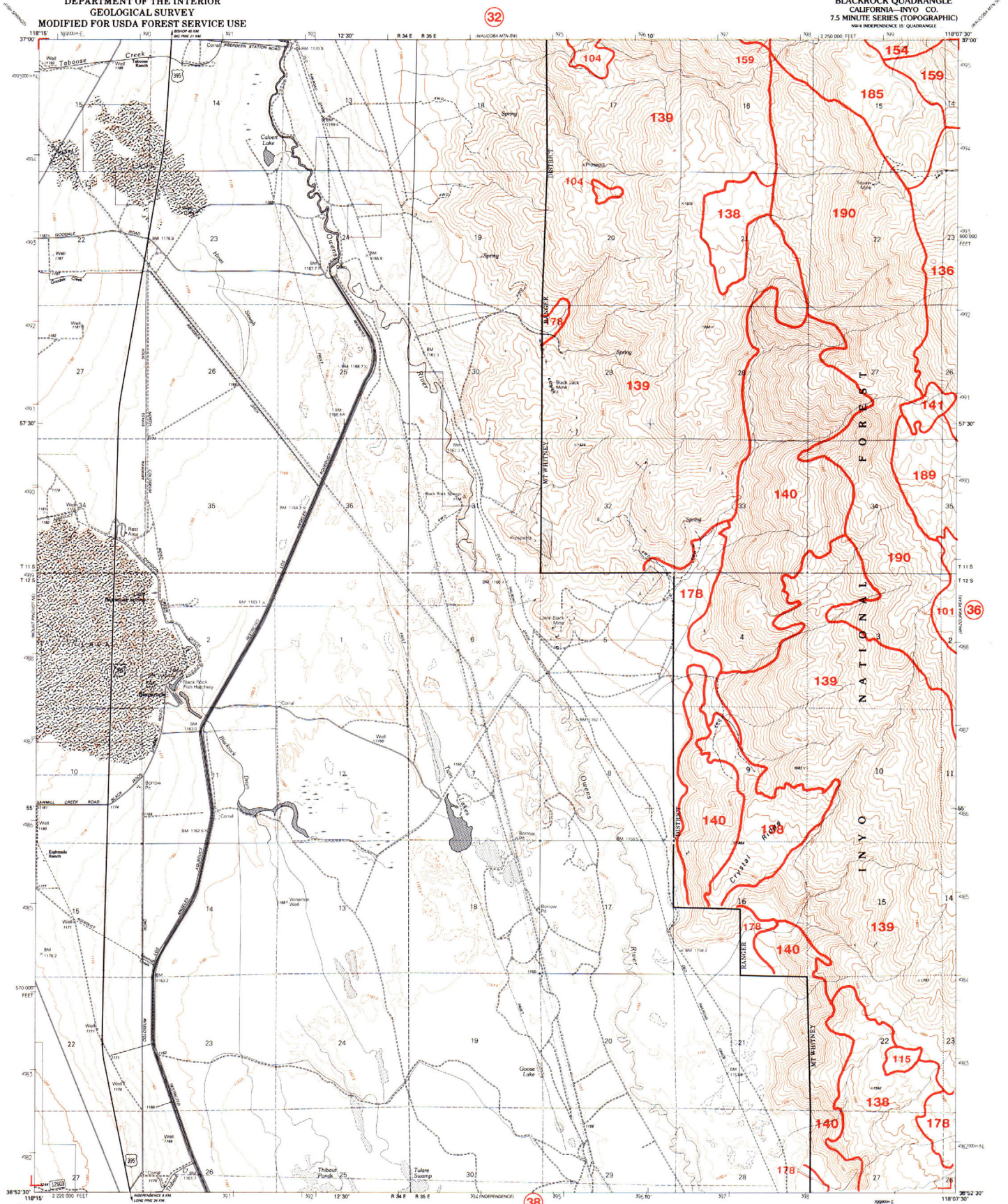
34

WAUCOBA SPRING SW, CALIF
N3706-W11752.5/7.5
(391-3C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

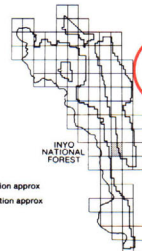
BLACKROCK QUADRANGLE
CALIFORNIA-INYO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NAD INDEPENDENCE IS QUADRANGLE



Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA
Compiled by photogrammetric methods from aerial photographs
taken 1978. Field checked 1979. Map edited 1982
Projection and 1000-meter grid, zone 11,
Universal Transverse Mercator
10,000-foot grid ticks based on California coordinate
system, zone 4, 1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 9 meters north and
83 meters east as shown by dashed corner ticks
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

LEGEND
National Forest Boundary
Alienated Land within the
Forest Boundary as of 1984
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protection
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land
Withdrawn BLM Land
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad
US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx



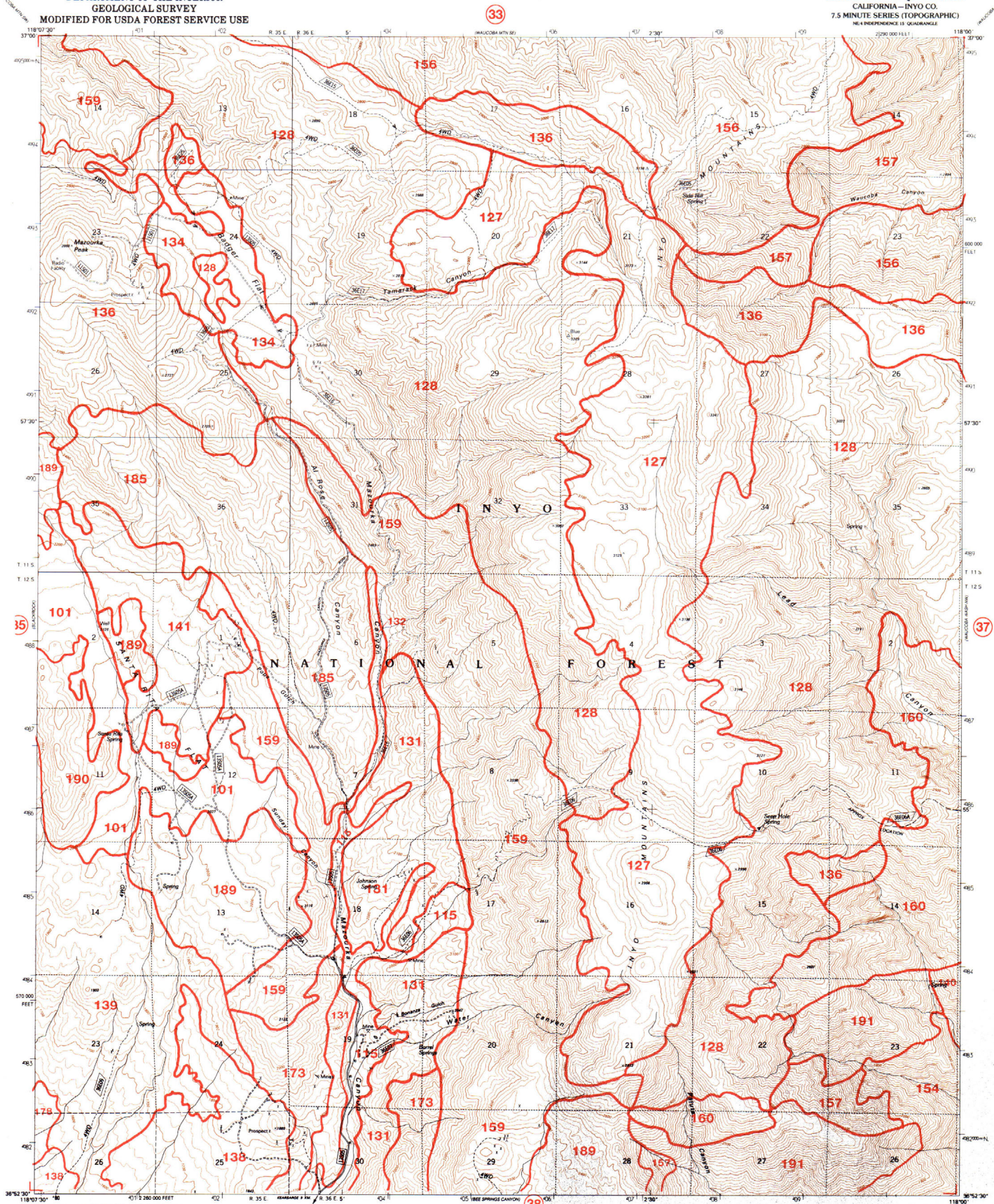
TO CONVERT METERS TO FEET MULTIPLY BY 3.2808
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
CONTING ELEVATIONS SHOWN TO THE NEAREST 0.1 METERS
OTHER ELEVATIONS SHOWN TO THE NEAREST METERS

BLACKROCK, CALIF.
NAD INDEPENDENCE IS QUADRANGLE
N3662 5-W11807 5/7.5
1982
REVISED 1984
(372-2C)

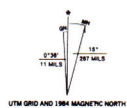
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

MAZOURKA PEAK QUADRANGLE
CALIFORNIA - INYO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NEA INDEPENDENCE 11 QUADRANGLE

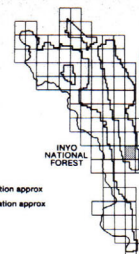
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA
Compiled by photogrammetric methods from aerial photographs
taken 1978. Field checked 1979. Map edited 1982
Projection and 1000-meter grid, zone 11,
Universal Transverse Mercator
10,000-foot grid ticks based on California coordinate
system, zone 4, 1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 9 meters north and 83 meters
east as shown by dashed corner ticks
Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



- LEGEND
- National Forest Boundary
 - Alienated Land within the Forest Boundary as of 1984
 - TOWNSHIP AND SECTION LINE CLASSIFICATION
 - Surveyed, Location Reliable
 - Surveyed, Location Approximate
 - Unsurveyed, Protection
 - Landnet revised according to additional Forest Service evidence
 - Primary Highway
 - Secondary Highway
 - Improved Light Duty
 - Unimproved Dirt
 - Trail
 - Locked Gate
 - Barrier
 - Railroad
 - US Highway
 - State Highway
 - County Road
 - Forest Highway
 - Forest Road
 - Forest Trail
 - Forest Service Trail location approx
 - Forest Service Road location approx



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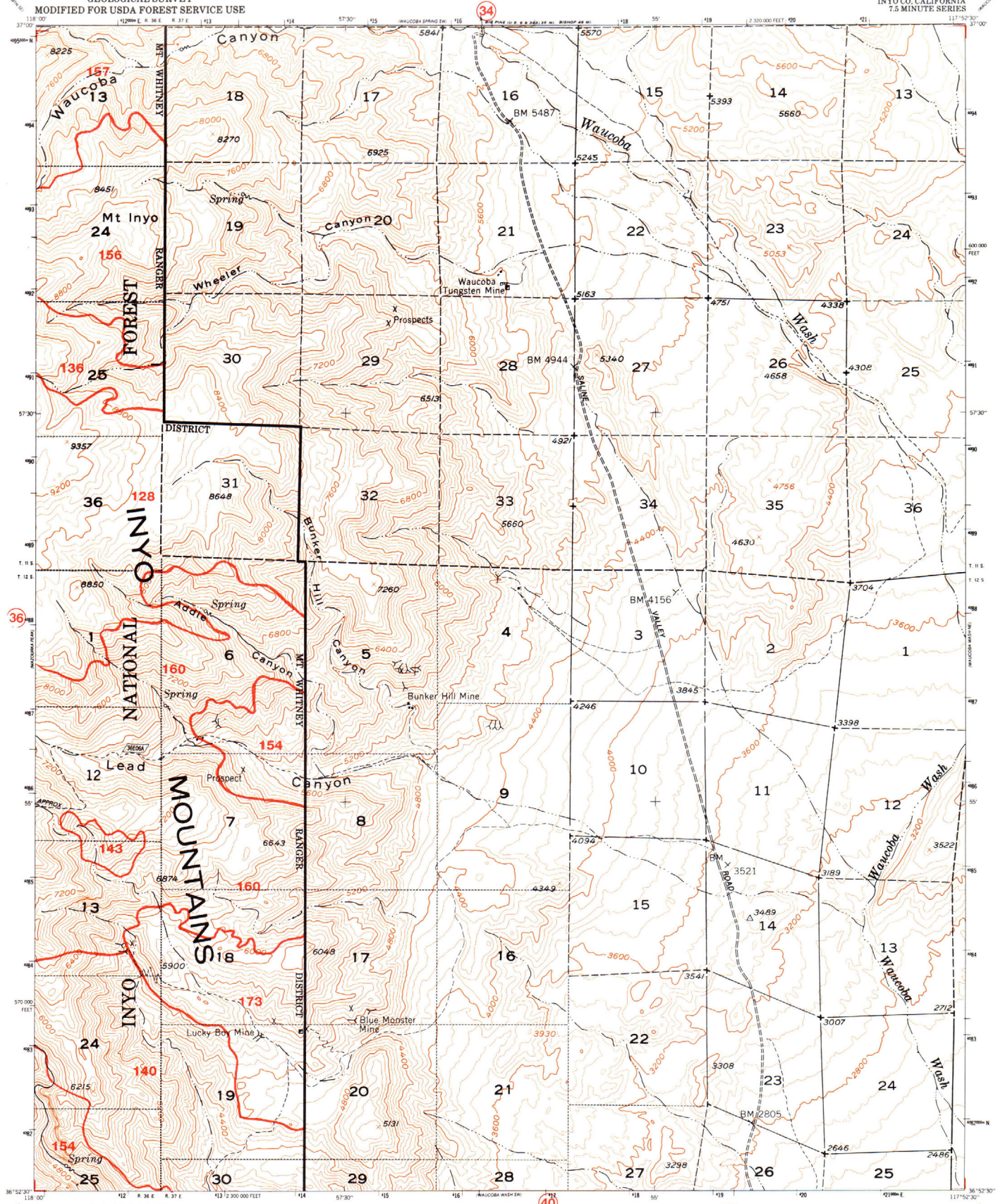
TO CONVERT METERS TO FEET MULTIPLY BY 3.2808
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
CONTOUR ELEVATIONS SHOWN TO THE NEAREST 0.1 METERS
OTHER ELEVATIONS SHOWN TO THE NEAREST METERS

MAZOURKA PEAK, CALIF.
NEA INDEPENDENCE 11 QUADRANGLE
N3652.5-W118007.5
1982
REVISED 1984
(372-1C)

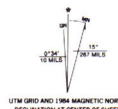
INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

WAUCOBA WASH NW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO. CALIFORNIA
7.5 MINUTE SERIES

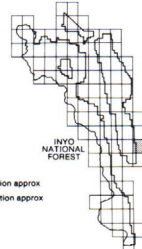
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1951
Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system zone 4
1000 metre Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region
Landnet revised according to additional Forest Service evidence



- LEGEND
- National Forest Boundary
 - Alienated Land within the Forest Boundary as of 1984
 - TOWNSHIP AND SECTION LINE CLASSIFICATION
 - Surveyed, Location Reliable
 - Surveyed, Location Approximate
 - Unsurveyed, Protraction
 - City of Los Angeles Land
 - Primary Highway
 - Secondary Highway
 - Unimproved Light Duty
 - Unimproved Dirt
 - Trail
 - Locked Gate
 - Barrier
 - Railroad
 - Withdrawn BLM Land

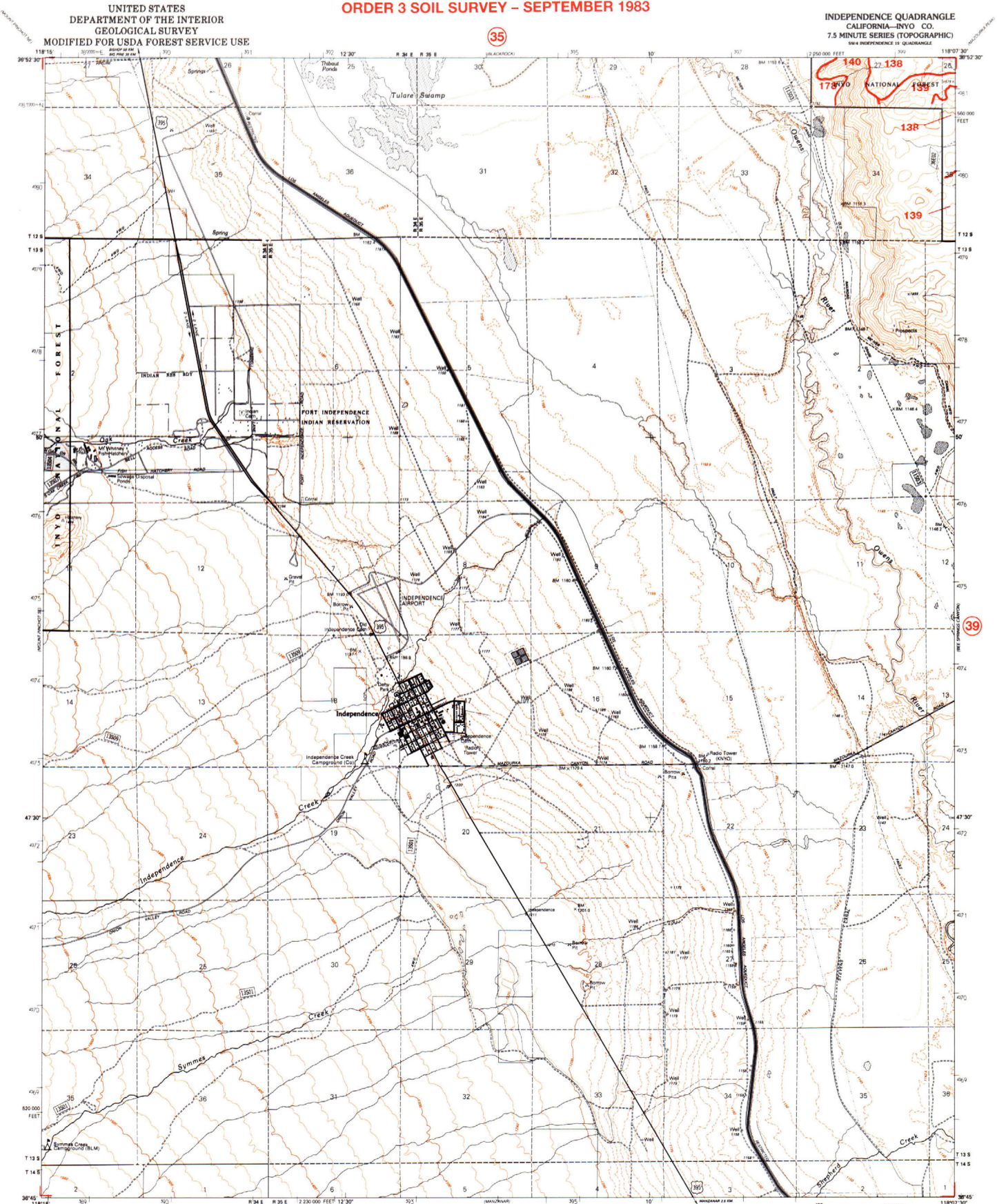


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WAUCOBA WASH NW, CALIF
N3882.5-W11705.4-7.5
(371-2C)
REVISED 1984

INYO NATIONAL FOREST AREA - EAST PART
ORDER 3 SOIL SURVEY - SEPTEMBER 1983

INDEPENDENCE QUADRANGLE
CALIFORNIA-INYO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW4 INDEPENDENCE 15 QUADRANGLE



Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA

Compiled by photogrammetric methods from aerial photographs
taken 1978. Field checked 1979. Map edited 1982
Projection and 1000-meter grid, zone 11,
Universal Transverse Mercator

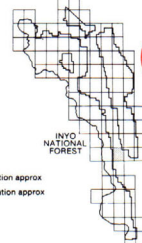
10,000-foot grid ticks based on California coordinate
system, zone 4, 1927 North American Datum
83 meters east as shown by dashed corner ticks

Five red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is unchecked
Photorevised by the Geomorphics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



CONTOUR INTERVAL 20 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

- LEGEND**
- National Forest Boundary
 - Alienated Land within the Forest Boundary as of 1984
 - TOWNSHIP AND SECTION LINE CLASSIFICATION
 - Surveyed, Location Reliable
 - Surveyed, Location Approximate
 - Unsurveyed, Protection
 - Landnet revised according to additional Forest Service evidence
 - City of Los Angeles Land
 - Primary Highway
 - Secondary Highway
 - Improved Light Duty
 - Unimproved Dirt
 - Trail
 - Locked Gate
 - Barrier
 - Railroad
 - Withdrawn BLM Land
 - US Highway
 - State Highway
 - County Road
 - Forest Road
 - Forest Trail
 - Forest Service Trail location approx.
 - Forest Service Road location approx.



TO CONVERT METERS TO FEET MULTIPLY BY 3.2808
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METERS
OTHER ELEVATIONS SHOWN TO THE NEAREST METERS

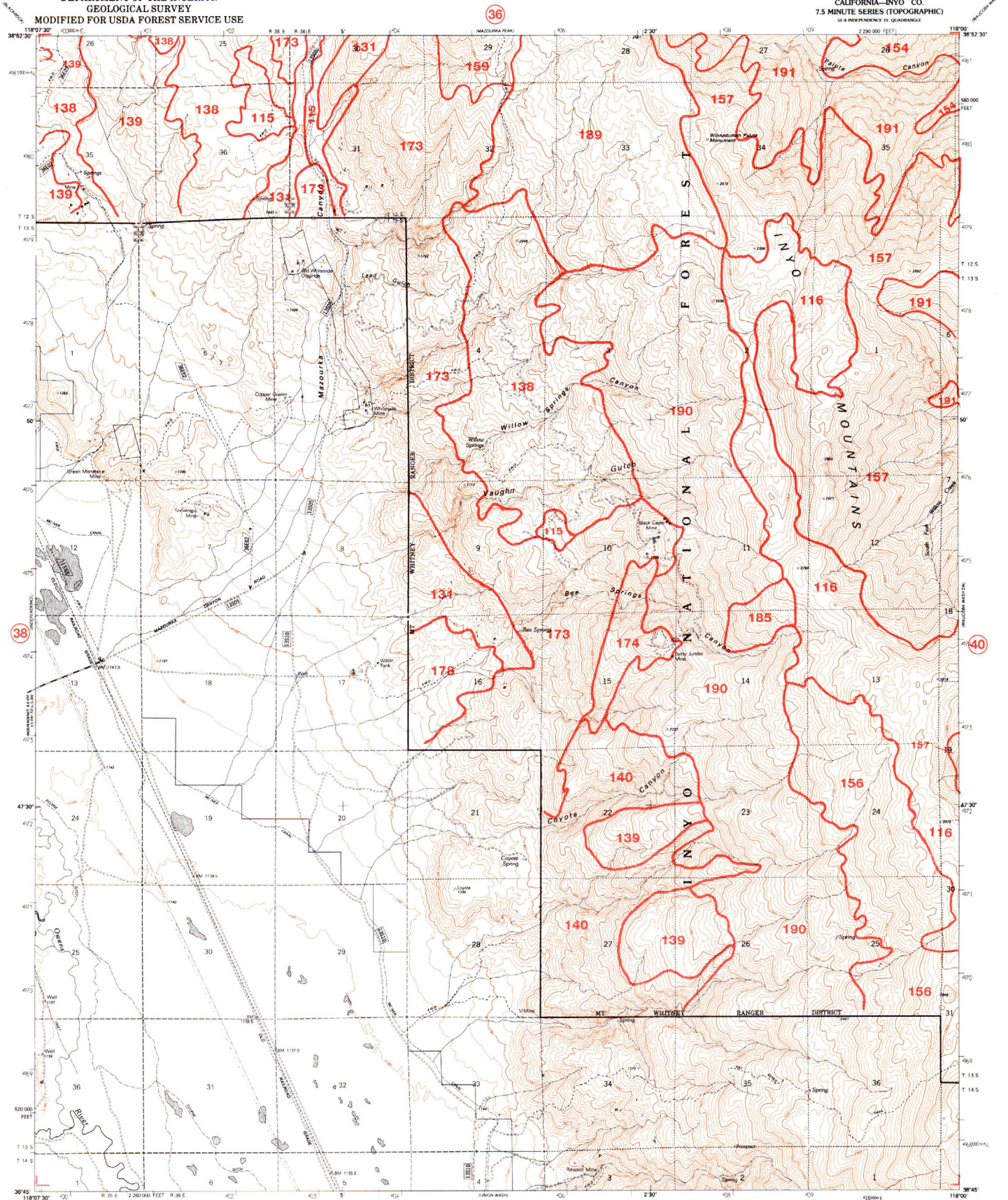
INDEPENDENCE, CALIF.
SW4 INDEPENDENCE 15 QUADRANGLE
N3645-W11807 5/5

1982
REVISED 1984
(372-3C)

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

BEE SPRINGS CANYON QUADRANGLE
CALIFORNIA-INYO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SCALE HORIZONTAL: 1" = 30,000 FEET
SCALE VERTICAL: 1" = 10,000 FEET

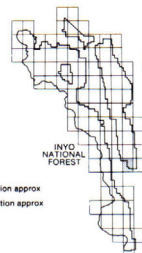


Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA
Compiled by photogrammetric methods from aerial photographs
taken 1976 and 1978. Field checked 1979. Map edited 1982
Projection and 1000-meter grid, zone 11.
Universal Transverse Mercator
10,000-foot grid ticks based on California coordinate
system, zone 4, 1927 North American Datum
To place on the predicted North American Datum 1983
move the projection lines 9 meters north and
83 meters east as shown by dashed corner ticks.
Photorevised by the Geomatics Service Center in 1984
from USGS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region

UTM GRID AND 1984 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

Legend

- National Forest Boundary
- Alienated Land within the Forest Boundary as of 1984
- TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction
- Landnet revised according to additional Forest Service evidence
- City of Los Angeles Land
- Withdrawn BLM Land
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- Locked Gate
- Barrier
- Railroad
- US Highway
- State Highway
- County Road
- Forest Highway
- Forest Road
- Forest Service Trail location approx
- Forest Service Road location approx



TO CONVERT METERS TO FEET MULTIPLY BY 3.2808
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
CONTOUR ELEVATIONS SHOWN TO THE NEAREST 0.1 METERS
OTHER ELEVATIONS SHOWN TO THE NEAREST METERS

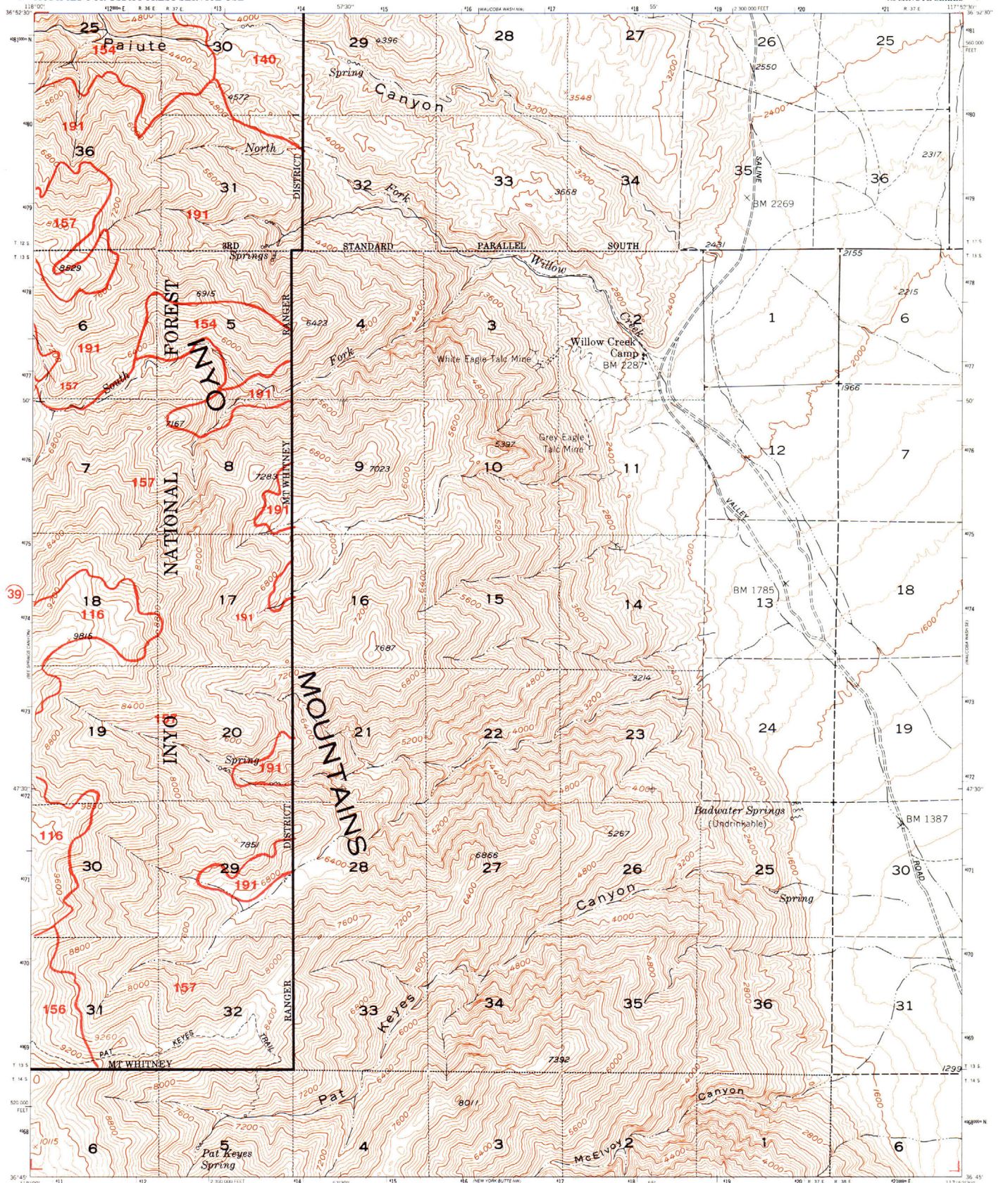
BEE SPRINGS CANYON, CALIF.
SCALE HORIZONTAL: 1" = 30,000 FEET
SCALE VERTICAL: 1" = 10,000 FEET

1982
REVISED 1984
(372-4C)

INYO NATIONAL FOREST AREA - EAST PART ORDER 3 SOIL SURVEY - SEPTEMBER 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

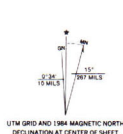
WAUCOBA WASH SW QUADRANGLE
MT DIABLO MERIDIAN
INYO CO., CALIFORNIA
7.5 MINUTE SERIES



Base map prepared by the U.S. Geological Survey
Topography by photogrammetric methods from aerial photographs
Map edited 1983

Polyconic projection 1927 North American datum
10,000-foot grid based on California coordinate system zone 4
1000-meter Universal Transverse Mercator grid ticks zone 11
INTERIM EDITION

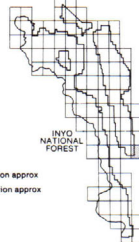
Photorevised by the Geomatics Service Center in 1984
from USFS aerial photographs and 1984 correction guides
furnished by the Pacific Southwest Region



TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protection
Landnet revised according to additional Forest Service evidence
City of Los Angeles Land

LEGEND
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Barrier
Railroad
Withdrawn BLM Land

US Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Forest Service Trail location approx
Forest Service Road location approx



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WAUCOBA WASH SW, CALIF
N3645-W11752.5/7.5
(371-3C)
REVISED 1984